RAILROAD GAZETTE

FRIDAY, MARCH 10.

Contributions.

A Chapter of Odds and Ends for Trackmen.

TO THE EDITOR OF THE RAILROAD GAZETTE:

The winter that is drawing to a close has been somewhat remarkable in a large portion of the country, and the present indications are that the spring will be a "little off," and it is safe to predict an early opening for track work, both on construction and repairs. In some portions of the country construction has not been retarded by winter weather, and the mildness of the weather that has prevailed has rendered work on track repairs a little mixed and out of the usual character. In some instances trackmen have improved their drainage and otherwise taken advantage of the mild weather, but there has been a great deal of fine weather wasted during the winter by neglecting work that might have been done and which would have forwarded the spring and summer work.

The "weather wise" sometimes make mistakes, and it is not always safe or advisable to hazard great preparations and undertake work on a large scale that is out of season, but one can keep along with the weather and take advantage of every fine day. Those who have not done this may partially make up for lost time by making good use of such good weather as is in store for us, be it more or less, although through March and April we may reasonably expect it to be *less*.

One of the principal neglected opportunities is the clearing of ditches. On some roads this has not been attended to, and they are in a miserable condition as a natural consequence. It is noticeable that in some instances a faint effort has been made to clear the ditches in cuttings by removing the thin mud from the water courses and depositing it on the slope; but the *deposit* is akin to that made in a savings bank of the period—it is not reliable. But there is this difference: The mud goeth back from whence it came, but the ducats are seen no more by the depositors forever. An open winter is productive of porridge in cuttings, and no favorable opportunity should be neglected for its removal, and it should be *removed* and not left to slide back and refill the ditches.

Pretty soon you will want to distribute ballast, and now is the time to prepare the ditches and road-bed to receive it, as well as ties and other materials that may be needed for repairs and renewals. The importance of this has been set forth in these columns at various times, and in some instances "the seed fell on good ground," but a resowing is found necessary to insure a crop from many waste places.

A year or two since, the writer of this article loaned a copy of the *Railroad Gazette* to a benighted individual who had 75 or 100 miles of track under his charge and was laboring under difficulties. His track was new, unballasted, poorly laid, and he had but little material and but a few men allowed him. His attention was drawn to a paragraph in the *Gazette* explaining the importance of keeping the rails level in cross section on tangents regardless of longitudinal surface on unballasted roads. The idea was this: Two opposite joints are low, and one of them much lower than the other, and there is not material enough to hold them both up to a good surface. The proper plan is to raise the lower joint (or centre, as the case may be) to a level with the one opposite. This can usually be done with the material at hand, although it may be scant.

The wheels of a locomotive or car will pass over depressions very nicely, providing they are level, on tangents, and on curves if the regular elevation is maintained. In either case, if one rail is lower than the point opposite, it gives cars and locomotives a "rock" or lurch to one side with a force sufficient to disturb the alignment. The person above mentioned remarked that he had no time to attend to surfacing, because it consumed most of the time to keep the track in line. He had not learned that the easiest way to preserve the alignment is by surfacing track crosswise. Of course it is always desirable to keep a good longitudinal surface, but this has reference to tracks that lay on a naked road-bed and cannot be put in good surface *both ways*. Not long since the writer met the aforementioned trackman on a trip over his (the Road-master's) road, when the latter remarked that the few hints he received from reading a column and a half in the *Gazette* had been worth a great deal to him and thousands of dollars to his company. "You see," said he, "that I had not been accustomed to 'keeping a road upon nothing,' and it was new business to me. The track being naked and nothing to hold it, those 'lop-sided joints' you spoke of kept me in constant trouble. I got tired of throwing the track into line. It would not stay, and we used to drive stakes at the ends of the ties, which afforded temporary relief; but the fearful lurches of our big locomotives would soon crowd stakes and all out of line. But when I adopted your plan of surfacing, I had no more trouble in keeping a good line, and the labor I used to put on the alignment I now put on the surfacing, which is like 'killing two birds with one stone,' it keeps up both line and surface with the labor that used to be consumed on lining alone. The whole line (nearly 400 miles) is now worked on that plan, and although there are many miles of it yet without ballast, the most of it is in fair condition. Our track is not smooth by any means, but when an engine or car goes down into a low place, it goes down both sides alike, and as the track is in line there is none of the old-fashioned slashing about from side to side, which was both dangerous and disagreeable."

There are others who might, like our friend, learn to make a better use of labor and material than they have been accustomed to, and the poorer their employers are the greater the necessity of making proper use of time and labor to insure the prompt appearance of the Paymaster.

Open winters are more liable to disturb boulders that lie on mountain sides and slopes than a constant hard winter, and the alternate freezing and thawing, together with frequent rains, render it dangerous in hilly countries on account of land slides and loose boulders. Trackmen should be vigilant and see that nothing can be precipitated on the track from the effect of frost and rains. A safe plan is to examine all these things thoroughly, and any rock, boulder or body of earth that looks suspicious should be dislodged and put out of the way by a competent force of men, where by such unexpected obstructions may be disposed of in such a manner as not to cause trouble.

The usual spring freshets are a great deal ahead of time this year, and a large area of the United States has already had its trouble in this line, but there are some sections of country yet covered with a considerable depth of snow, which may cause trouble if it goes off with rains, and it is well to see that water-courses are not obstructed with drift-wood or floating ice. A little precaution at this time may save a great deal of trouble, and trouble with trackmen means destruction to life, limb and property.

It is not likely that much damage will result from ice gorges the coming season, but it is well to have an eye out where there is any possibility of trouble from that source.

The main thing with trackmen at all seasons is to adopt measures to avoid a repetition of any trouble that occurred last year or any years previous. Railroad men should consider themselves as in constant warfare with the elements, and be ever on the alert to foil the enemy, from whichever direction he may come.

A few spring-like days will prepare the dead leaves and dried grass for the usual spring fires, and a stray spark may at any moment start a fire that will consume much fence and other property. Wood-sheds and round-houses accumulate a great deal of combustible matter during the winter, and unless there is a general cleaning up they are ready to be burned in the spring. A *sweep* in time may save a fire.

WM. S. HUNTINGTON.

Criticism of the Forth Bridge.

TO THE EDITOR OF THE RAILROAD GAZETTE:

For want of time I could not sooner ask your permission to say a few words in reply to Mr. C. L. Strobel's communication in your issue of Feb. 17, 1882, in which he takes exception to my criticism of the Forth bridge design, and imputes to me unfairness and want of appreciation for its authors and designers.

I do not wish that my skepticism at their designs should be interpreted as deficiency in courtesy to them or want of esteem for their high reputation; for should they think so I would be sorry and ready to apologize. The fact remains that the design, as published in the London *Engineer*, describes the *matured principle* of the proposed construction, and that it forms a legitimate matter for criticism, perhaps expected and desired by the English engineers.

Mr. Strobel has not correctly stated the points which I had made and to which he objects. He is pleased to say that I did not mention the difficulty of making connections with the proposed tube sections. It is the very thing I had emphasized, and had added that the mastery of any bridge construction becomes manifest in the disposition and arrangement of and for the connections and the facility of their manufacture.

Further, I am made to say that it will be impossible to get inside of the 12-ft. tubes. I have neither said nor implied this. Then follow some remarks on columns and tubular bridges.

On columns, this may be said:

1. As yet we are not prepared to admit for them a reasoning "from small to big," analogous to the one used once for the tubular bridges, namely, from short to long plate-girders. We rather suspect that the imperfections of manufacture, which in small columns (such as ordinarily used in our bridges) under wear become hardly noticeable, are likely to prove elements of danger in large columns, especially if carried to the extreme of 360 × 12 ft.

I am not unmindful of England's producing the largest steel armor plates and of having plant for steel work in proportion, but I do not imagine that they have or are likely to get plant large enough to produce a column of the Phœnixville pattern 360 ft. × 12 ft. diameter. The London *Engineer* gives as a reason for the intended use of the tubular section that experiments have proven that inch for inch it is the strongest, which no one can gainsay, for ordinary lengths. A column 12 in. diameter 30 ft. long, composed of spliced plates, say 20 in. × 10 in. × ¼ in., and with such minimum bracing, as the London *Engineer* mentions, would be a mere model on a scale of $\frac{1}{12}$ for the proposed monsters. There are, I think, not many bridge engineers who have not had a visit from some patentee of some new bridge of wonderful strength. To prove it, he would show you a model perhaps 4 ft. long and 8 in. high, put it on two chairs and sit square down on it, and assure you that if you take the proportions of rods, braces, chords and his own weight, his bridge is stronger than anything in existence. And there are a good many to whom the reasoning is as logical and sound as to the patent-peddler himself. He will not conceal his contempt for you, if you tell him that a bridge 200 ft. long built to his proportions would fall down from its own weight. We have no experience how far a similar argument may not be true for small and big columns. The proposed 360 × 12 ft. columns for the Forth bridge are a risky experiment at best.

2. The theory of columns is yet uncertain, having been derived from a limited number of tests on a comparatively small scale; the sometimes conflicting results of these tests indicate a complexity of condition yet to be solved. For the theoretical speculator it has great attractions as admitting of argument *ad infinitum*. The *practical* bridge builder wants to know more, and as it happens, it is one of the reasons why that, just at present, we are petitioning Congress for an appropriation for tests of iron and steel on a larger scale, such as individual firms cannot undertake for their costliness.

3. To hold up a big load at a great height, the open tower form (frame) proves the best and safest, admitting of manufacture from sizes and shapes obtainable in the market, and greater facility of erection. The resulting stresses, vertical and transverse, both traveling a prescribed way, can be traced with some certainty under assumed unfavorable conditions of loading.

4. Because the spans are of unprecedented length, and because trains are to go over it at 30 miles an hour, it does not yet follow that it should require unexampled forms and means for construction, which always mean increased cost. To my knowledge there are no works in England and on the continent making bridge-building an *exclusive* business, as is the case in the United States; and what these, with their special tools and plant for the rapid, accurate and economical execution of heavy bridge-work could not accomplish without great cost, it is fair to presume cannot be done any cheaper in England. In this respect a visit to the United States would benefit the esteemed authors and advisers of the Forth bridge.

In reference to the tubular bridges, of which Mr. Strobel is kind enough to inform us that trains manage to get inside of them, it may be said, without unfairness or want of appreciation for the truly great and courageous engineers who built them, that their bridges to-day could profitably be sold for scrap, to almost pay for modern frame and structures which are lighter, stronger, and incomparably cheaper to maintain.

Mr. Strobel mentions the erection of the Conway and Britannia bridges as instances of lifting heavy girders, which is true, for they had no other practicable way left to get them into position. But it is possible that there is a difference between lifting from a big stone pier, building up underneath (as was the case with the above-named bridges) and lifting from cantilevers 150 ft. overhead. In Chicago blocks of houses, much heavier than 2,000 tons, have been lifted and moved from their foundations, without causing cracks in the walls. I myself had occasion to propose lifting 4 ft. high, a bridge 1,000 ft. long, keeping travel going over it, in all about 2,400 tons. Such performances, however, differ, one would think, in cost and risk from lifting 1,600 tons for 150 ft. from cantilevers in such way as to be secure "*against hurricanes at all stages of erection.*"

Even if the English engineers intended to avail themselves of the action of the tides for lifting their 500-ft. spans, the risk and cost would still be likely to prove greater, as compared with the method of "building out to meet." That it was preferred in the instance of the Kentucky River bridge, as against "lifting," confirms the opinion of it being a safer and more economical method of erection for long spans, where false works are impracticable. As it requires an excess of material over what is needed in the finished structure, the aim of the engineer must be to make it as small as possible. The English design does not promise this, notwithstanding that the London *Engineer* mentions this method of erection as the one proposed. It will be admitted that the question of erection needs to be considered in choosing a bridge type. It is pertinent to remark on this occasion, that for bridging our great detrital rivers, in view of announced legislation for longer spans and greater height for navigation, and considering the hazardous erection on high false-works (see Glasgow Bridge over Missouri River), the risk of which the railroads are always careful to put on the bridge contractor, the use of the customary parallel chord trusses for long and short spans alike will gradually change to the use of types which admit of at least equal final economy and of erection without false works in the dangerous portions of a river.

I presumed the principle of lateral bracing in cantilever bridges to be known, but to some Mr. Strobel's explanation may be welcome.

My complaint of irreverence for authorities is caused by disappointing experience. No doubt much valuable information can be had from them, but, take nobody's word for it and try it yourself, is a safer rule.

My sketch was merely to suggest how the proposed design could be modified to bring it within reach of even the largest bridge works with existing plant and with sizes and shapes obtainable in the market. However, my humble individual opinion is, that a design is possible, filling all the previously stated six conditions, without exceeding a height of 360 ft. for vertical towers, requiring for erection no excess of material above what is needed in the finished structure, and permitting greater economy in construction and erection than the design proposed.

The English railroad companies projecting the bridge being assured that it can be built, will ask how much will it cost.

If there is a sin for which the engineering profession has ever been rightfully reproached it is for making short estimates.

It would be a good plan for the English railroad companies and their esteemed engineers to invite competition

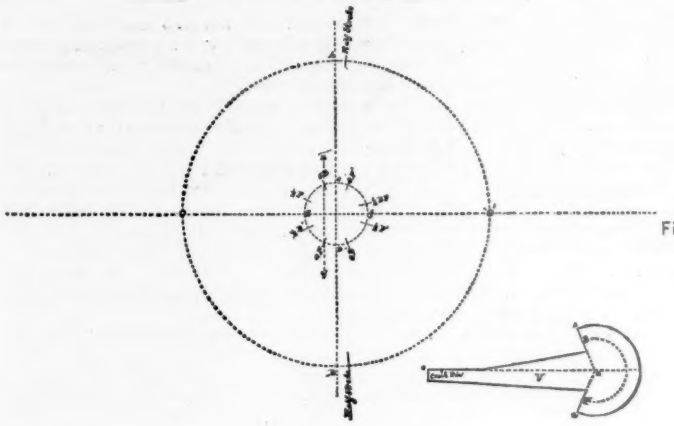


Fig. 1.

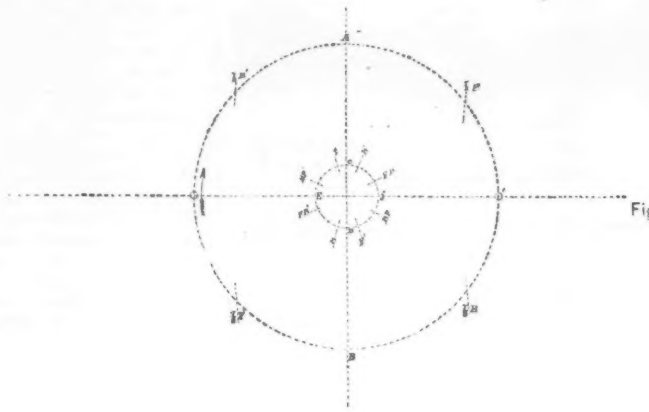


Fig. 2.

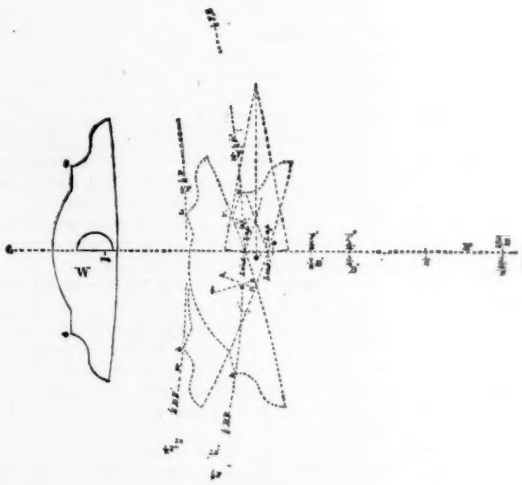


Fig. 3

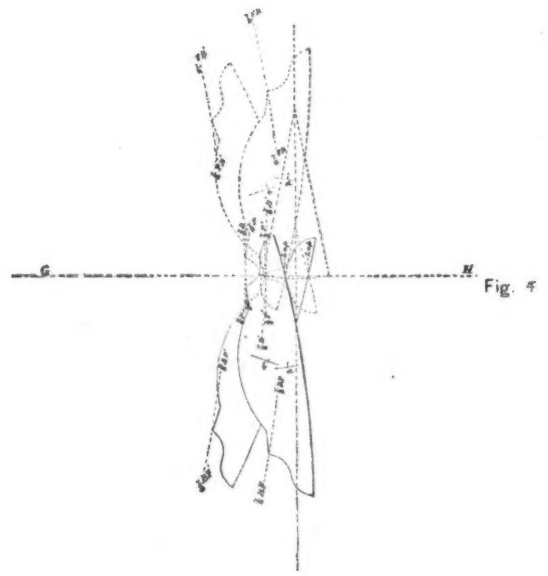


Fig. 4

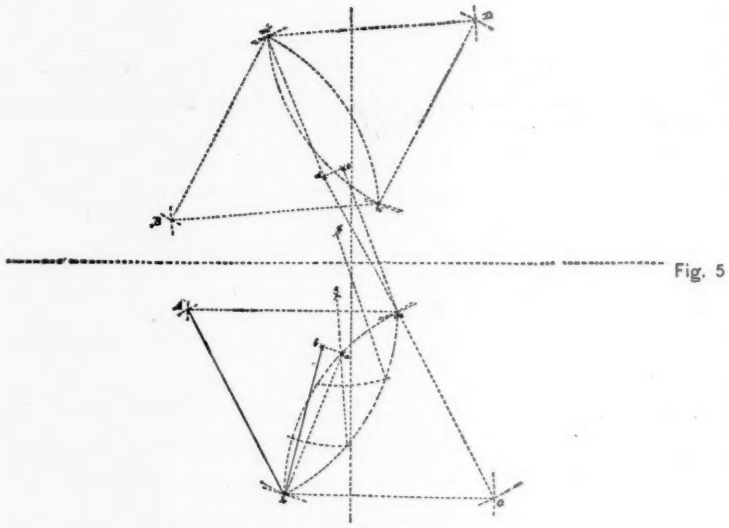


Fig. 5

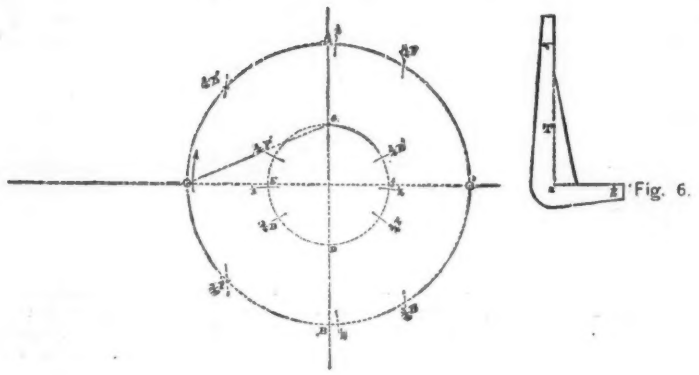


Fig. 6.

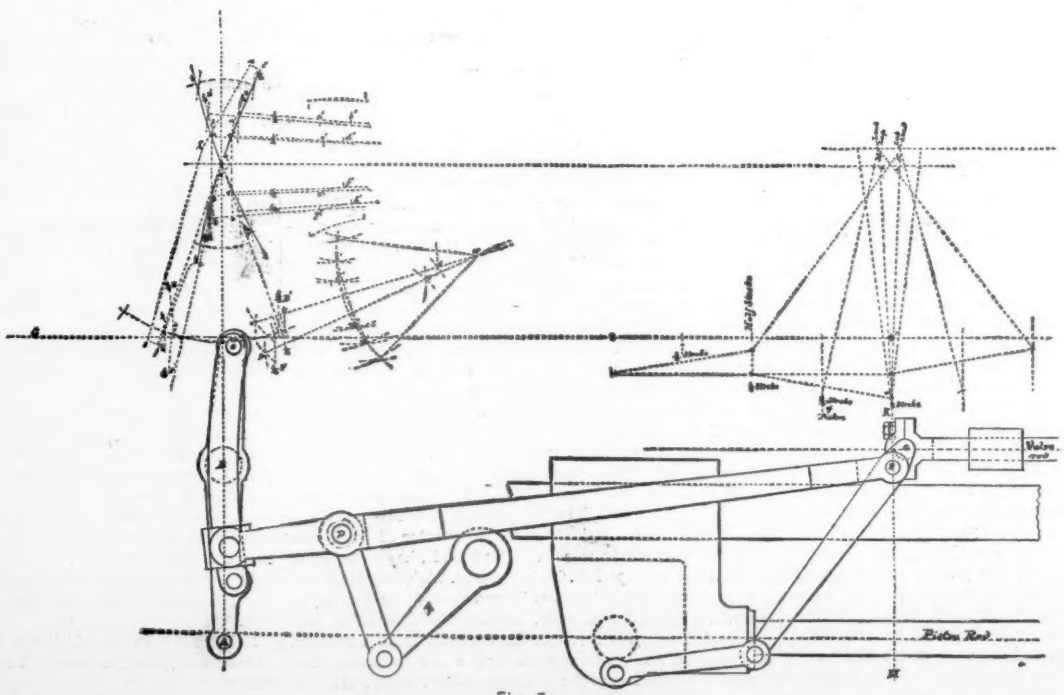


Fig. 7.

LINK MOTION DIAGRAMS.

for prices from among English and European bridge-builders. (American bridge-builders could not compete, with material and labor so much higher here, even if English patriotism would let them.) The instances of the Douro Bridge and more recently of the proposed Rhine Bridge at Mayence, show how many different ingenious plans may be proposed for given conditions. The plans should be accompanied by an estimate of cost at which the proposing parties are ready and willing to build the bridge. This would reliably inform the railroad companies as to what the bridge *would* cost, and also enable them to select a good design.

Such a course for the Tay Bridge would probably have prevented the disaster, though the first cost of the bridge would probably have been greater.

G. LINDENTHAL, Bridge Engineer.

PITTSBURGH, March 3, 1882.

Contribution to the History of the Link Motion.

BY JOHN L. WHETSTONE, ESQ., CINCINNATI, OHIO.

This paper is published in the February number of the *Journal of the Franklin Institute*, prefaced by the following letter from Mr. Coleman Sellers, directed to the Committee of Publication of the Franklin Institute:

"In view of the recent proposed changes in the system of link motion for steam engines it seems very desirable that the work already done in the same direction should be recorded. I therefore wrote to my friend Mr. Whetstone for his recollection of a system originated by him, whereby he obtained with one eccentric a reversing link, and employed the motion of the cross-head to give the lap and lead. Also for his method of plotting the ordinary link motion. The paper now submitted has been sent to me for such use as I may desire to make of it. During the time that he was engaged on the work he describes I had full knowledge of his methods, as I was with him in the same establishment, being foreman of the locomotive shop in which he had charge of the drawing room. Mr. Whetstone was one of the most brilliant of the mechanical engineers who at that time turned their attention to the locomotive, but the necessity arising for him to take charge of important interests not involving so directly an attention to this branch of mechanical engineering, his attention has in some measure been directed from it. Submitting his paper with this note as explanatory, I am, Yours truly,

"COLEMAN SELLERS."

In the years 1851-2 the writer assisted in the designing and constructing some locomotive engines for a special purpose, and the arrangement of the valve gear was especially assigned to him. From the peculiarity of the general arrangement of the machinery, it was found impracticable to use more than one eccentric for operating the valves of each engine, and it was necessary to use a valve with considerable lap. There being barely room for one eccentric for each engine on the driving axle, the device of shifting a lead eccentric across the axle for the purpose of obtaining lead for the forward and backward movements could not be applied. The valve gear which was finally adopted was substantially the same as represented in fig. 7, with slight modifications. The eccentric was set so as to be at half-throw when the crank-pin was at the ends of the stroke or at the dead point, and connected by a rod to an arm on the rocker shaft having at its other end a double arm, carrying a link bar for the purpose of giving reversing movements to the valve. The position of the rocker arm and link bar was therefore the same when the crank was at either end of the stroke, viz.: that shown in the fig. 7 at *A B C*. For the purpose of giving the advanced movement requisite for the lap and lead of the valve, the shifting or reversing rod (one end of which is properly swiveled to the link bar) is connected to the fulcrum *F* of a lever, the longer arm of which is suitably attached to the cross-head of the engine, the shorter arm being geared to the valve-rod at *G*, or to any suitable device necessary to transmit the movement to the valve. The length of the arms of this lead-lever are such that when the fulcrum *F* is at the half throw of the eccentric the upper wrist of the lever *G* is removed from the centre line *HK* to the extent of the lap and lead of the valve, the longer end connected with the cross-head then at one end of the stroke, and if the cross-head be at the other end of the stroke, the upper wrist will be as far removed to the opposite side of the centre line.

It will also be observed that the position of the wrist operating the valve-rod will remain the same, in whatever part of the link bar the reversing bar or rod *DF* may be situated, whether in full gear forward or backward, or at any intermediate point, and the lead of the valve will be the same at both ends of the stroke. The throw of the eccentric for this valve gear will be shorter than the travel of the valve, inasmuch as part of the valve movement is obtained from the cross-head. In practice it is found that about two-thirds of the lead of the valve is obtained from the cross-head, and the eccentricity of the eccentric is lessened to that extent. At first sight it would seem as though the whole was due to the cross-head, but it must be borne in mind that during the last half of each stroke of the piston the eccentric motion is in a direction opposite to that of the cross-head, thus combining the two movements to extend the travel of the valve. The effect of this combination is to accelerate the movement of the valve at the opening of the ports, and to retard it at and toward the end of the throw of the valve, thus giving a longer admission of steam with a given lap of valve than by the eccentric motion alone. It would be quite practicable to operate the rocker-arm link of one engine from the cross-head of the opposite engine, the lead being obtained from its own cross-head, and probably the greatest objection to such an arrangement would arise from the fact that the disability of one engine through an accident would render the valve movement of the other engine inoperative.

In 1853-54 the link-motion, as it is termed (combining the movement of the forward and backward eccentrics) began to be generally adopted on locomotives, in place of the hooked or forked eccentric rods previously employed for reversing movements of the engine, in connection with separate eccentrics and valves arranged for the purpose of cutting off the steam at different parts of the stroke. The almost universal employment of the link motion at the present time in engines of every description which are required to run at high rates of speed, affords evidence of its acknowledged superiority over other forms of valve gear.

At the time of their first introduction, the great difficulty of adjustment of the working parts so as to produce equality of cut-off or suppression of the steam on both strokes of the piston at all desired positions of the link gear operated as a serious objection to their use. The writer being then engaged in designing and constructing locomotives in a large establishment, determined, if possible, to devise a system of arrangement of the various parts of a link gear which should secure the above results. The difficulty of this problem is enhanced by reason of the variety of elements modifying the movements of the valve, and which must be taken into the account in its solution—as, for instance, the proportionate lengths of the main connecting rod and crank, the lap and lead as compared with the travel of the valve, length of rocker arm, radius of link, all of which to some extent require modifications of the link gear. Adopting as a motto the aphorism of Lord Bacon that Nature can only be conquered or rendered subservient to our purposes by implicit obedience or compliance with her laws, the writer determined to find the several positions of the link requisite to produce suppression or cut-off at the principal points in the stroke of the piston, in forward and back gear, and then endeavor to arrange the reversing gear so as to maintain the link in the position so ascertained. For this purpose the positions of all the main lines and centers of the several parts of the engine involved were accurately laid down of full size on a drafting table, viz., the centre line from cylinder to driving axle, showing centre of cross-head wrist at each end of the stroke, and at half-stroke, and three-quarters and seven-eighths stroke each way. They are described by the centre of wrist on rocker arm to be operated by the link, on which are marked the lap and lead for the valve, as previously determined upon, the centre line from driving axle bisecting the arc described by the rocker arm in its travel. In the accompanying illustrations this last named line is coincident with the centre line from cylinder to driving axle. The circles *O A O' B*, figs. 1, 2, represents the circuits described by the crank wrist, and *D E c f* the circuit described by the centre of the two eccentrics. The positions of the crank-pin at the different parts of the stroke are obtained by using a tram or beam compass set to the length of the distance between the centres of the driving axle and that of the cross-head wrist at half stroke shown at ⅛ on line *G H*, fig. 3 (thus representing the length of the main connecting rod), one leg of tram being placed at the desired point in the stroke. With the other leg arcs are described intersecting the crank circle *O A O' B* at points marked half stroke, fig. 1, and ⅜ *F*, ⅜ *B*, ⅜ *F'*, ⅜ *B'*, fig. 2. The position of the forward and back eccentric are determined by drawing a line, *A B*, fig. 1, through the centre of the driving axle at right angles to the centre line extending to the rocker arm to be operated by the link, and another line, *X Y*, parallel to *A B* and distant from it equal to the amount of lap and lead to be given to the valve. The points of intersection with the circle *D E c f* will represent the centres of the two eccentrics when the crank pin is at *O* at the end or commencement of the stroke.

A template *V*, fig. 1, is made of sheet metal or stiff card board, having a small hole at *z*, and with edges coincident with the crank-pin, and with radial lines *z* 1, *z* 2, passing through the centre of the eccentrics *F B*, and by inserting a needle through the small hole *z* into the centre of the driving axle and placing the edge *z c* at the intersections representing the crank-pin at various portions of the stroke the positions of the eccentrics at each position of the crank can be marked with a pencil or pen intersecting the circle *D E c f*. Thus the forward and back eccentrics respectively will be at *O F* and *O B*, fig. 1, when the crank is at *O*; at ½ *F*, ½ *B F* when crank is at half-stroke; at *O F'* and *O B'* with crank at *O'* and at ½ *F'* and ½ *B F'*, with crank at the other half-stroke. By a similar procedure the relative positions of the eccentrics at any other desired point of the stroke, say seven-eighth stroke, is obtained as shown in fig. 2, where *F* and *B F* are the centres of the forward and back eccentrics with crank at ⅞ *F*, moving in the direction of the arrow, and *F'* and *B F'*, with crank at ⅞ *F'*, and *B* and *F B*, with crank at ⅞ *B*, and *B'* and *F B'*, with crank at ⅞ *B'*, moving in the opposite direction.

Another template *W*, fig 3, is made with a curved edge having a radius equal to the distance from the points *C* or *D*, fig. 1, 2, to the rocker-arm wrist when at mid throw, the corners 3, 4 representing the centres of the knuckles connecting with the eccentric rods, a hole being cut through the template, one side of which coincides with a straight line dividing the link into two equal portions. The length of the eccentric rods is obtained by placing the curved edge of the link template opposite to the corner 3 in contact with the rocker-arm wrist centre when at mid throw, at *O'*, fig. 3, and moving the body of the template to a position where the same tram will touch the points *D*, figs. 1 and 3, on the template, and *C*, figs. 1 and 4 on the template. With the length thus obtained as a radius, and the centres at the intersection ⅛ *F* and ⅛ *F'*, fig. 1, describe the arcs ⅛ *F*, ⅛ *F'* above the centre line *G H*, fig. 3, and from the centres ⅛ *B F* and ⅛ *B F'*, fig. 1, describe below the centre line the arcs ⅛ *B F* and ⅛ *B F'*, fig. 3. The lap of the valve having been marked as shown in fig. 3, the template *W* is now placed with its corner 3 in contact with the arc ⅛ *F*, and corner 4 in contact with arc ⅛ *B F*, and moved along until it reaches the place indicated in fig. 3, where the curved edge cuts the point marked *Lap*, being the point of suppression or cut-off, and with a pen or pencil the line *a b* is drawn along the straight side of the hole in the template. By a similar process, using the arcs ⅛ *F'* and ⅛ *B F'* the line *c d* is obtained, and their intersection at *e* determines the vibrating centre of the link and its position to cut-off at half stroke on the forward movement of the engine in the direction of the arrow, fig. 1. By a similar process the intersections at *g* are obtained, being the position of the link-vibrating centre for the backward movement of the engine. The vibrating centre of the link should be marked on the template at *m*.

The next step to be taken is to obtain the position of the vibrating centre of the link in order to cut off the steam at seven-eighths stroke of the piston in forward and back gear. For this purpose, with the centre *F*, fig. 2, and the length of eccentric rod for radius as before, the arcs ⅞ *F*, fig. 4, is described downward from the centre line and a little above it, each end of the arc being suitably marked to identify it, and from the centre *B F*, fig. 2, the arc ⅞ *B F*, fig. 4, is described at some distance below the centre line, and suitably marked. By traversing the corners 3, 4 of the link template *W* along these arcs until the curved edge intersects the lap point, the position of the vibrating centre in order to effect cut-off at seven-eighths stroke is found to be at *a*, fig. 4. By describing the arcs ⅞ *F'* and ⅞ *B F'*, fig. 4, from the centre *F'* and *B F'*, fig. 2, and traversing the template *W* as before, the position for the vibrating centre of the link for cut-off at seven-eighths stroke in forward gear is found to be at *b*. By similar procedure the corresponding positions for back gear are found at *c d*, fig. 4.

Having now ascertained the precise vibrating centre of the link, and its required positions to effect equal suppression of steam at the most important parts of the stroke both in forward and back gear, it now remains to adjust the reversing gear to meet those requirements. Fig. 5 represents at *a b c d e g* the several points determined in the other drawings. The length of the suspending or sustaining bar on which the link vibrates being determined upon, with this length for radius the intersecting arcs *h* and *h'* are described from *a* and *b* as centres, and *m* and *m'* from the centres *c* and *d*. Then with the centres *h m* with the length of the lifting arm for radius the intersecting arcs *A C* are described, and from *h'* and *m'* the intersecting arcs *B* and *D*, all which points indicate a possible position for the reversing shaft. The reversing shaft may be located at any of the points *A*, *B*, *C* or *D*, though in practice the writer always adopted that shown at *A* in all the locomotives constructed under his direction. In practice all the operations were performed on one drawing by describing the arcs of the eccentric rods in different colored inks, and with dotted or full lines to avoid confusion of lines, and the indications of the diagrams were fully realized in practical operations of machinery constructed in accordance therewith. To insure against possible errors in the drawings, every different class of valve gear was tested on a full-sized adjustable working model before commencing on a working machine. With a well constructed working model capable of adjustment to all the varied positions and proportions for cranks, eccentrics, rocker arms, connecting rods, etc., with links of proper radii, the position for the vibrating centre of the link at the various points of suppression or cut-off can be readily obtained after careful adjustment of the eccentrics and rods so as to obtain the correct lead to the valve, when the piston is at either end of the stroke, by moving the vibrating centre of the link on the central line as *G m*, fig. 3, until the position *m* is obtained such that with the piston at either half-stroke, when the link is moved to the point of suppression for either stroke, the vibrating centre shall be at the same point, which can be ascertained after a few trials. The exact position on the link for its vibrating centre being determined, if the cross-head is set at three-fourths or seven-eighths stroke for each stroke, the position of the vibrating centre of the link can be noted for the point of suppression at each stroke both in forward and back gear, and the position for reversing shaft can be determined as explained in fig. 5.

Fig. 7 represents the general arrangement of rocker arms, link and cross-head attachment for a valve movement with a single eccentric, or its equivalent, which in this case, fig. 6, is a wrist on the end of one arm extending from the crank-pin toward the axle centre, and adjusted so as to occupy the position marked *C* at right angles to the line from the axle centre to the rocker arm at mid-throw when the crank-pin is at *O*. The template *T* is used for marking the positions of the wrist *C*, fig. 6, at various parts of the stroke, as in the case before described, and the template *a b c d e f g h*, with a hole corresponding to the rocker shaft, is used to mark the positions of the link at corresponding parts of the stroke, the dotted lines *k m*, *n m*, represent the positions of the lead lever to cut off at both half strokes. Now with the centre *p*, and the shifting bar for radius, the arc *s t* is described, whose intersections 2, 3 show the proper position for the shifting bar to cut off at half stroke in forward and back gear, and with centre *r* and same radius, the arc *u v* is described for the purpose of determining the cut-off points, 4, 5, for the other half stroke. By marking off on a straight edge the length of the shifting bar and the point of suppression *D*, and laying this straight edge at *p* 2, *p* 4, the points of suspension *c' d'* are obtained. By similar process the points *a' b' e' f' g' h'* are ascertained, being the points of suspension for cut-off at half-stroke and three-quarter stroke for both strokes in forward and back gear. From these points as centres the intersecting arcs *i' k' m' n'* are described, with the suspending bar for radius, and by bisecting the chords *i' m'* and *k' n'*, the centre for the reversing shaft *x* is found, and the length of reversing arm determined. The reversing shaft may be placed above the centre of the rocker shaft, and its position ascertained by similar process; but when practicable the position below the rocker shaft is preferable. This style of valve gear is more especially applicable and adapted to freight engines having small drivers, inasmuch as all the valve gear is readily within sight and reach, and with a given lap and travel of valve a longer admission of steam in full gear is attained, with the same range of cut-off as in the shifting link. The uniformity of lead at all positions in gear is not favorable to the attainment of the highest speeds required in passenger traffic.

Joint Executive Committee Meeting.

Pursuant to the call of the Chairman, the Joint Executive Committee convened at 12.15 p. m., Wednesday, March 1, at No. 346 Broadway, New York.

The following companies were represented:

Baltimore & Ohio, Robert Garrett, Frank Harriott, C. K. Lord, C. S. Wight.

Boston & Albany, Wm. Bliss, Arthur Mills.

Canada Southern, W. P. Taylor, W. H. Perry, W. H. Hurlburt.

Chicago & Alton, H. H. Courtright.

Chicago, Burlington & Quincy, E. P. Ripley, Percival Lowell.

Cincinnati, Hamilton & Dayton, J. H. Devereux, O. B. Skinner, A. H. McLeod, A. J. Smith.

Cleve., Col., Cin. & Ind., O. B. Skinner, A. J. Smith, Edgar Hill.

Detroit, Grand Haven & Mil., Godfrey McDonald, T. Tandy.

Fitchburg, J. Whitmore.

Grand Rapids & Ind., A. B. Leet.

Great Western, G. B. Spriggs, Wm. Edgar.

Indianapolis & St. Louis, O. B. Skinner, H. W. Gays, A. J. Smith.

Indiana, Bloomington & Western, H. C. Diehl.

Lake Erie & Western, E. H. Waldron, W. S. Weed.

Lake Shore & Michigan Southern, John Newell, G. H. Vaillant, J. T. R. McKay.

Marietta & Cincinnati, R. M. Fraser, T. P. Barry.

Michigan Central, H. B. Ledyard, J. A. Grier, A. W. Street.

New York & New England, G. H. Williams.

New York Central & Hudson River, W. K. Vanderbilt, H. J. Hayden, C. B. Meeker.

New York, Lake Erie & Western, Robert Harris, Jno. N. Abbott, R. C. Vilas.

N. Y., Penn. & Ohio, E. Foley, J. M. Adams, P. D. Cooper, W. B. Shattuc, G. G. Cochran.

Ohio & Mississippi, William Duncan.

Pennsylvania Company, E. A. Ford, William Stewart, D. S. Gray, C. L. Cole, R. W. Geiger.

Pennsylvania Railroad, A. J. Cassatt, J. R. Wood, J. McC. Creighton.

Phil., Wil. & Baltimore, J. S. Wilson.

Pitts., Cin. & St. Louis, E. A. Ford, F. L. Kingsbury.

Troy & Boston, Joseph Crandell, C. A. Nimmo, C. E. Lambert.

Vandalia Line, E. A. Ford, H. W. Hibbard.

Wabash, St. Louis & Pacific, A. C. Bird, J. M. Osborn.

The following companies, members of the committee, were not represented:

Boston, Hoosac Tunnel & West.; Central Vermont; Chicago & Grand Trunk; Chicago, Ind., St. L. & C.; Det., Lansing & North; E., T. H. & Chicago; Grand Trunk; Ill. Midland; Louisville & Nashville; N. Y., N. H. & Hart.; Peoria, Decatur & Evansville.

Also present, Albert Fink, Chairman; C. W. Bullen, Secretary; H. C. Blye, General Agent.

WEDNESDAY'S PROCEEDINGS.

ADDRESS BY THE CHAIRMAN.

"GENTLEMEN: The Executive Committee has not met since Aug. 10, 1881. It is not necessary to refer at length to the unsatisfactory state of affairs that has existed since that time in the management of the freight and passenger traffic of the railroad companies which you represent.

"The want of co-operation on the part of the members of

this association, in maintaining the established tariffs, has prevented the railroad companies not only from securing reasonable compensation for their services, but has forced them to expend a large amount of money in carrying traffic for less than cost.

"The principal object for which this meeting has been called, is to consider what measures should be adopted to secure the maintenance of reasonable and just tariffs, in order to prevent the great losses that have been incurred, as well as to correct the many evils which necessarily result from a want of co-operation, and of which the public have a just right to complain.

"I have already notified the members of the committee, in my letter of Feb. 11, and Circular No. 314, that the trunk lines have entered into agreements as to the division of the freight and passenger traffic, which agreements are of such a character as will secure hereafter a co-operation of those lines, which is a pre-requisite to the success of any measures you may adopt.

"The Trunk Line Executive Committee, which acts also as your Standing Committee, suggests to you the consideration of the following measures, viz.:

[The Chair then read the suggestions made by the Standing Committee, but to avoid repetition, and as the reports were substantially adopted, the resolutions, as finally passed by the committee, will be reported at the proper place.]

"The Chairman continued:

"I suggest that this general plan, with such modifications as you may deem necessary, shall be perfected, with the view of remedying the grave evils of past railroad management.

"I hope that the members of this Committee are prepared to take decisive action at this meeting. It is the general sentiment that there is no use of making any further agreements for the maintenance of tariffs, if no measures are provided to carry out such agreements.

"There are some other subjects to come before the meeting, but they need not to be acted upon, if no agreement is reached upon the more important matters.

"The meeting is now ready to proceed to business."

The report was read by sections, and each section separately considered and adopted, except Articles V. and VI., which were referred to a committee for amendment.

The following gentlemen were appointed upon said committee: Messrs. Ledyard, Harriott, Skinner and Gray.

The article referring to the division of passenger earnings was referred to a committee consisting of the general passenger agents of the roads represented.

DIVISION OF TRAFFIC.

The Chairman said that the next question for consideration was the division of traffic at initial points; that it was necessary to adopt some improved methods for the purpose of carrying out such division, and that he would recommend that committees, composed of the representatives of the initial roads at the various points, consider the subject and report their conclusions to this meeting, and said that prompt action was necessary. There was a general feeling that the east-bound tariff could and should not be advanced before measures were taken that would guarantee the maintenance of rates.

Another important question to be considered was the division of live stock traffic and advance of rates on live stock. Nothing can be done to advance the rates until divisions of live stock traffic are made at Western points. The trunk lines have agreed upon a division of the live stock traffic, but the percentages have not yet been determined. This need not prevent the Western roads from completing their divisions. Some binding arrangements should be made by which rates will hereafter be maintained, and he would suggest as an improvement on former methods that the 10 per cent. drawback heretofore allowed when live stock was forwarded according to the instructions of the joint agents, be collected by the terminal roads at the points of destination and placed in the hands of a joint agent, to be refunded to the shipper when shipments have been made, in accordance with the directions.

COMMITTEES ON DIVISIONS.

The Chairman then stated that all there remained to be done to-day was the appointment of the various committees, which he announced as follows:

Chicago Committee.—Messrs. Newell (Chairman), Ledyard, Harriott, Stewart (Mr. Fink representing the Chicago & Grand Trunk.)

St. Louis Committee.—Messrs. Bird (Chairman), Gays, Hibbard, Courtwright, Duncan.

Cincinnati Committee.—Fraser (Chairman), Kingsbury, Skinner, Cochran.

Indianapolis Committee.—Messrs. Gray (Chairman), Skinner, Ingalls, Bird.

Louisville Committee.—Messrs. Duncan (Chairman), Geiger, Burke.

Detroit Committee.—Messrs. Spriggs, Taylor, Vaillant (Mr. Fink representing Grand Trunk).

Toledo Committee.—Messrs. McKay (Chairman), Spriggs, Taylor, Cole, Bird.

Cleveland Committee.—Messrs. Cochran (Chairman), Vaillant, Cole.

Peoria Special Committee.—Messrs. Gays, Skinner, Hibbard, Bird, Grier.

On motion, meeting adjourned to Thursday, March 2, at 1 o'clock p. m.

THURSDAY'S PROCEEDINGS.

The Committee reassembled pursuant to adjournment, at 2.35 p. m.

As a number of the roads were not represented at the meeting yesterday, whose representatives are now present, the Chairman read again the recommendations of the Standing Committee.

The report of the committee appointed yesterday was then read by Mr. Ledyard, the Chairman, and the whole reported as amended, was then adopted.

BASIS OF AGREEMENT.

The following are the resolutions as finally adopted:

"*First.* That a division of traffic, both of dead freight and live stock, shall be made and carried out from the principal cities of the West—Chicago, St. Louis, Peoria, Indianapolis, Cincinnati, Toledo, Detroit, Cleveland, and all other cities where such a division may be practicable and desirable—and that this division shall not only be made between the initial lines of the railroads at the respective points, but it shall extend to the western termini of the trunk lines.

"*Second.* In order to carry out this division, the plan of making money settlements monthly is recommended.

"*Third.* That arrangements shall be made by which rates are to be fully maintained from all points, whether there is a division of traffic or not, and for that purpose that each of the general freight agents of the road upon which the traffic originates shall be held responsible for the strict maintenance of rates which may be established by the Executive Committee, so that in case rates are not maintained the responsibility can be fixed positively upon the General Freight Agent, or such other officer as may be specially designated by each company on whose line of roads the freight originates.

"*Fourth.* That all authority to vary rates or to meet reduced rates of competing lines shall be absolutely withdrawn from the line and soliciting agents. It shall be the duty of these agents to report any violation of agreement by competing lines to the general freight agents of the initial roads, over which the line is operated, at the point where such violation occurs, and the general freight agents shall report to the Chairman of the Executive Committee, who shall take action under the agreement of March 11, 1881, with the advice of the Trunk Line Executive Committee, as provided in said agreement.

"*Fifth.* That at all points where traffic is divided, a joint agent shall be employed, who shall be under the immediate direction of the general freight agents of the initial lines, acting jointly, and who shall have the supervision of all bills of lading issued, with power to examine the books, manifests and accounts of the different railroads and their fast freight lines, with the object of ascertaining that all freight is engaged and shipped at tariff rates, and that the agreements for the division of traffic are fully complied with.

"*Sixth.* That line agents and soliciting agents at points where a division of traffic is made shall be placed under the full control of the joint agent, who is to direct them as to the line over which they are to solicit or not to solicit business, in order to assist in the equalization of balances, as agreed upon in the division.

"*Seventh.* When traffic originates upon roads which are not represented on the Joint Executive Committee, the connecting roads over which the traffic passes, represented on the Committee, shall be held responsible for the maintenance of rates, and shall under no circumstances charge less than the full proportion of the through rate; and all roads represented on this Committee shall refuse to receive any traffic upon which the agreed rates established by this Committee are not maintained, and joint notice to that effect shall be given to all connecting roads.

"*Eighth.* That no rebate vouchers of any kind shall be paid by any of the trunk lines, or any Western roads or line organizations on through business that passes over the trunk lines, without such vouchers are first submitted to the office of the Chairman for approval; and the auditors and treasurers of the roads represented on the Joint Executive Committee shall furnish to the Commissioner monthly certificates that no such rebate vouchers have been paid except so authorized.

"*Ninth.* That no time contracts shall be made under any circumstances, and that all freight carried under existing contracts, on and after March 13, 1882, shall be reported and accounted for at full rates in any division that may be made, so as to throw the loss of revenue upon the lines having made such contracts in violation of existing agreements.

"*Tenth.* It is recommended that a division of the passenger traffic shall be made between the Western connections of the trunk lines, upon a similar plan to that adopted by the latter, with a view of securing an equitable division of this traffic among connecting roads, and to reduce the expenses of conducting the passenger traffic, and also to hereafter prevent the payment of commissions to agents who render no service to the railroads or to the public.

"*Eleventh.* That the twenty-seventh article of the organization of the Joint Executive Committee, which provides that all questions arising between the members relative to the establishment and maintenance of tariff shall, in case of disagreement, be settled by arbitration, shall be recognized in the adjustment of differences arising between the members of this Committee.

"*Twelfth.* That the Executive Committee of the Trunk Lines are requested to report a plan for the reorganization of the Board of Arbitration, and also to recommend the names of persons who shall constitute such Board, and submit the same to the Joint Executive Committee for approval."

All the roads represented at the meeting voted in favor of the adoption of the reports, viz.: Baltimore & Ohio, Boston & Albany, Canada Southern, Cincinnati, Hamilton & Dayton, Chicago & Alton, Chicago, Burlington & Quincy, Cleveland, Columbus, Cincinnati & Indianapolis, Fitchburg, Grand Rapids & Indiana, Great Western, Indianapolis & St. Louis, Indiana, Bloomington & Western, Lake Erie & Western, Lake Shore & Michigan Southern, Marietta & Cincinnati, Michigan Central, New York Central & Hudson River, New York, Lake Erie & Western, New York & New England, New York, Pennsylvania & Ohio, Ohio & Mississippi, Pennsylvania Co., Pittsburgh, Cincinnati & St. Louis, Vandalia Line, Wabash, St. Louis & Pacific.

The Chairman stated that the resolution required the unanimous consent of the members of the Committee, and that he would send copies of the resolution to the absent members, and request their vote immediately.

ADDITIONAL POINTS AT WHICH DIVISION OF TRAFFIC SHALL BE MADE.

On motion of Mr. Newell, it was agreed that the Chairman appoint a committee of nine, representatives of the Western roads, who shall name the additional places at which it is desirable that a division of traffic be made, and that each member of the Joint Executive Committee present submit to said Committee, in writing, the points at which, in his opinion, such division should be made.

The Chairman appointed the following committee: Vaillant, Cochran, Bird, Cole, Duncan, Hill, Weed, Spriggs, Diehl.

The reports of the different committees appointed Wednesday to consider the division of traffic were then called for.

The Chicago, Peoria, Indianapolis and Cincinnati committees asked for further time.

The Toledo Committee reported that they had agreed to meet at Cleveland at an early day to consider the matter, and in the meantime would obtain the necessary statistics required, which were not then on hand.

The Cleveland Committee also reported that they did not have sufficient data on hand to take up the subject, but would meet at Cleveland at an early day and endeavor to come to an agreement.

REPORT OF THE ST. LOUIS COMMITTEE.

The St. Louis Committee reported as follows:

"*Resolved*, That the present percentage and regulations of the St. Louis dead freight pool be continued."

The St. Louis lines having agreed upon the percentages each line is to receive on east-bound business, and having further agreed that they desire a physical division of the traffic so pooled, they unanimously recommend that the business so pooled shall be absolutely under the control and the direction of the Commissioner or his representatives at St. Louis; and the St. Louis lines agree that orders emanating from the Commissioner or his agents shall be complied with.

It is further recommended that the St. Louis agency shall be under the direct control of the Commissioner; that the expenses of that office shall be paid by the Commissioner instead of by the initial roads as heretofore.

"*Resolved*, That the present percentages of the St. Louis live stock pool be continued, and that such regulations as may be adopted for carrying out similar pools at Chicago and other points shall be adopted and enforced by the St. Louis lines."

Report of committee accepted.

REPORT OF THE DETROIT COMMITTEE.

The Detroit Committee reported as follows:

"*Resolved*, That dead freight and live stock tonnage to be allotted the Grand Trunk and Lake Shore & Michigan Southern railways, from Detroit proper to all points east of and including the western termini of the trunk lines, and east of Toronto for New York state, New England and any point south of New York state, be based upon the statistics of rail tonnage carried east to the territory named during the years 1880 and 1881."

Commissioner Fink agrees to the above on the part of the Grand Trunk Railway, subject to the approval of said railway as to the basis of division, which, if not agreed upon by the interested parties, shall be decided by arbitration.

"*Resolved*, That the Commissioner prepare statistics of the dead freight and live stock tonnage passing the Detroit and St. Clair rivers, arising at points west of the river towns, and destined to points east of and including the eastern termini of the trunk lines, and east of Toronto for New York state, New England, or any points south of New York state, and that the percentage to be allotted the Grand Trunk Railway be based upon the relative tonnage said road carried during the year 1881, with such modifications as are justified by the changes which have since taken place affecting the distribution of traffic between the connecting roads."

Commissioner Fink agrees to the above resolution on the part of the Grand Trunk Railway, subject to their approval as to the basis of division or percentages, which, in case of disagreement, is to be determined by arbitration.

REPORT OF CLASSIFICATION COMMITTEE.

The Classification Committee made a report, which was adopted to take effect Monday, March 13, 1882. It adds 27 articles to the list, changes the classification of 24 and strikes out one.

A sub-committee, to whom was referred the matter of rates on dressed hogs, respectfully recommend that the same be classified as follows:

Dressed hogs, O. R., in refrigerator cars, to be charged five cents per 100 lbs. above the rate on dressed hogs in common cars.

Dressed hogs, in any quantity, in other than refrigerator cars, O. R., same as dressed beef.

ADVANCE IN EAST-BOUND RATES.

The Chairman said: "The next subject for consideration is the advance of east-bound tariff. You are all aware that a few days ago a meeting was held at Cleveland, at which an advance of east-bound rates was recommended. A vote of the Joint Executive Committee was taken, which brought out the fact that some members objected to an advance, on the ground that present rates were not maintained, and that it was useless to make further advances until this was done. It is now for the Western roads to say whether they are willing and able to maintain rates. If so, the objection is removed; but there is another difficulty in the way, namely, the time contract, which is the worst feature that has to be contended with; and unless the practice of making time contracts can be abolished, all attempts to increase or maintain rates will be futile."

Mr. Newell said that in order to obtain expressions of the opinion of the members present he would offer the following motion: That on and after March 13, 1882, the tariff on east-bound freight be advanced to the extent of five cents per 100 lbs. on eighth class, with a corresponding advance on seventh and ninth classes, and on live hogs.

Mr. Devereux referred to the disparity between through and local rates, and the action of the legislatures of various states in relation thereto, and requested that through rates be advanced to the basis of 25 cents per 100 lbs. on eighth class, Chicago to New York, in accordance with Mr. Newell's motion, in order to avoid the unjust discrimination between local and through rates.

A vote was taken on Mr. Newell's motion to advance east-bound rates, which was unanimous in favor of the increase.

ABROGATION OF CONTRACTS ON EAST-BOUND FREIGHT.

The Chairman said that it would be no use to put the increased tariff into effect on the 13th, if steps were not taken to get rid of time contracts. After a full discussion, the following motion was offered by Mr. Gray, and adopted:

"That the general freight agents of the initial roads at Chicago, Cincinnati, St. Louis, Indianapolis, Peoria and Louisville, meet, and that each general freight agent examine the contracts over his road, which have been reported to the chairman, and ascertain whether they cannot be abrogated, or whether they may not have expired by limitation. In case contracts are found that have to be carried out, the same to be reported to the commissioners, who shall report to the meeting whether, in his opinion, it is possible to make the proposed increase in the tariff; and, if not, shall name the tariff rate that can be charged to meet the lowest contract rates."

The chairman appointed the committees, and named the following gentlemen to act as chairmen, viz.: Chicago, McKay; Cincinnati, Fraser; St. Louis, Bird; Indianapolis, Kingsbury; Peoria, Diehl; Louisville, Geiger.

REPORT OF GENERAL PASSENGER AGENTS REGARDING THE DIVISION OF PASSENGER TRAFFIC.

Mr. E. A. Ford presented a report of proceedings of the general passenger agents, at their meetings, March 1 and 2, which report was accepted.

On motion, the report of the general passenger agents was adopted as the action of this committee.

Adjourned to Friday, March 3, at 1 P. M.

FRIDAY'S PROCEEDINGS.

Committee reassembled, pursuant to adjournment, at 2:45 P. M.

ABROGATION OF CONTRACTS AND ADVANCE IN EAST-BOUND RATES.

The chairman said that the committees appointed at the meeting of yesterday to examine the contracts on east-bound freight, that had been filed in this office, were prepared to report, and he took pleasure in stating that the committees would present much more favorable reports than had been anticipated.

The reports of the Chicago, St. Louis, Cincinnati, Peoria, Indianapolis and Louisville committees were then read in full.

The Chairman said that from these reports it appeared that many of the contracts which had been filed at his office were in the nature of engagements that had no binding force, and that the parties over whose lines these engagements had existed had agreed to abrogate the same. There were some contracts upon whiskey and lumber, and it would be necessary to reduce the rates upon these two articles so as to meet the contract rates.

Both these recommendations having been accepted by the meeting, the Chairman declared that there was now nothing in the way of advancing the tariff rates 5 cents on the 7th and 8th classes, as per resolution of the day previous; and he would give notice that this advance took effect on the 13th inst.

The Chairman further recommended that the rate on high wines be made 35 cents per hundred, with the understanding that, where contracts existed that made it necessary to

put all parties on the same footing, a rebate of 5 cents may be allowed.

He also recommended that the lumber rate be at once reduced to 30 cents, on a basis of Chicago to New York.

REVISION OF CONTRACTS AND SETTLEMENT OF DRAWBACKS.

The following resolutions were then unanimously adopted :

"*Resolved*, That a revised list of contracts be sent to the Commissioner by each of the general freight agents of the initial roads over which said contracts were made; said list not to embrace any contracts that were not already reported, but merely to omit such as have expired by litigation or have been abrogated.

"*Resolved*, That commencing with March 13, 1882, all drawback vouchers that become necessary, in order to carry out the existing approved contracts, shall be submitted to the Chairman for approval before they are paid. All freight shall be billed at full tariff rates from and after that date."

REPORT OF THE COMMITTEE ON ADDITIONAL POINTS AT WHICH TRAFFIC SHOULD BE DIVIDED.

Mr. Vaillant, Chairman, made the following report:

The committee appointed to ascertain from what additional points it would be practicable and desirable to make divisions of traffic, respectfully report that they recommend the divisions of traffic be made from the following points, viz.: Columbus, Springfield, Dayton, Lima, Galion and Marion, O.; Lafayette, Ft. Wayne, Evansville, Terre Haute and Muncie, Ind.; Pekin, Cairo and Quincy, Ill.; Hannibal, Mo.; Burlington and Keokuk, Iowa; Grand Rapids, Kalamazoo, Jackson, Lansing, Battle Creek, East Saginaw, Saginaw City, Bay City and West Bay City, Mich.

"The committee would further recommend, that in order to simplify the organization and secure consequent economy, the divisions at smaller points be grouped into districts under the charge of one joint agent, as may be agreed upon by the roads interested.

"It is further recommended by the committee that the Chairman of the Joint Executive Committee appoint a committee, composed of one member from each road interested in the division, at each point named in the foregoing report, in order that they may prepare the necessary statistics and arrange meetings at an early day as possible, to perfect their organization."

On motion, the report of the committee was adopted.

DIVISION OF LIVE STOCK TRAFFIC.

The Chairman said that it would be necessary for the meeting to agree upon a method by which the live stock division could be carried out hereafter.

Yesterday he had recommended that the ten cents rebate on shipments should be withheld until after the shipper had complied with the requirements of the Joint Stock Agent at the point of origin, and that the rebate should then be paid shipper through the Joint Stock Agent or his duly appointed representative.

Mr. Vilas said that, inasmuch as these shipments were made from so many points of the West, it might be better to have these rebates refunded through this office.

Mr. Newell suggested that it would be well to have the recommendations of the Chairman fully stated in a report of this meeting, and that all members be requested to report directly to the Chairman their views upon the subject and defer final action until the next meeting.

The Chairman said that this would postpone action in relation to advancing live stock rates; and until the next meeting, which might not be held sooner, that he would suggest that the question as to particular method of conducting the live stock business hereafter be referred to the Trunk Line Executive Committee for definite action.

The proposition, as last stated by the Chairman, was unanimously adopted.

REPORTS OF COMMITTEES ON DIVISION OF TRAFFIC.

The Chicago Committee made the following report:

"*First.* We have agreed to make a division of the competitive traffic, which shall date from March 13, 1882.

"*Second.* That we adjourn to meet at the office of the Commissioner, March 15, 1882, to resume negotiations for a division; and that, then failing to agree, we will submit the questions at issue to a Board of Arbitration to be named by the Trunk Line Executive Committee, and that such submission shall be made before April 15, 1882."

The Cincinnati Committee present the following report:

"*First.* We have agreed to make a division of the competitive traffic, which shall date from March 13, 1882.

"*Second.* That we adjourn to meet at Cincinnati on the 20th inst., to resume nogotiations for a division: and that then failing to agree, we will submit the questions at issue to a Board of Arbitration, to be named by the Trunk Line Executive Committee, and that such submission shall be made on or before April 15, 1882, and that the division shall take effect on March 13, 1882."

Mr. Duncan said that the St. Louis Committee had nothing further to report than what was reported yesterday, March 2.

Mr. Gray said that the Indianapolis Committee would not present any formal report, but that the present arrangements at Indianapolis would continue in effect until agreements had arrived at Chicago and the other points, and that any new division that may be agreed upon will take effect on March 13.

Mr. Diehl said that he was the only representative from Peoria present, but that as far as he knew, the existing arrangement at Peoria was satisfactory to all parties, and that upon his return to Peoria he would endeavor to arrange for the division of traffic at that point, commencing March 13.

The Chairman said that the agreement for the division of traffic at Louisville had never been abrogated, and all that was required was to commence on March 13 to distribute the traffic according to the agreed percentages.

The Chairman then announced that there was no further business before the meeting, unless some member should desire to bring some additional subject.

A motion was then made to adjourn, which was carried.

ALBERT FINK, Chairman.

C. W. BULLEN, Secretary.

Master Car-Builders' February Meeting.

In the absence of the President, Mr. C. A. Smith, the Secretary of the Association presided at the meeting Feb. 16. The subject for discussion was "Train Brakes for Freight Cars, and the Desirability of Applying Brakes to all the Wheels of Freight Cars." He said he had written to about fifty persons in different parts of the country asking them to give their views upon both subjects, and had received answers from a number which would be read.

The American Brake Company, of St. Louis, wrote that the St. Louis & San Francisco Railway have on their line:

20	cars which have been in service		12	months.
100	"	" about	8	"
200	"	"	4	"
400	"	"	3	"
500	"	"	2	"

The company invited the Committee of the Car-Builders' Association on Freight Train Brakes to examine these cars.

Mr. AYLESBURY, of the Kansas City, St. Joseph & Council Bluffs Railroad, wrote that he thought that either the Westinghouse or the Eames Vacuum Brake could be adapted for use on freight trains. For easy curves he could not see the necessity or economy of using double brakes. He also referred to the trouble arising from the diversity of patterns of brake heads and shoes in use; and thought the railroad companies should all agree to adopt one common pattern.

Mr. SNOW, of the Illinois Central Railroad, wrote that he thought continuous freight-train brakes were very desirable, but, thus far, those he had seen were too complicated. In case continuous brakes are used he thought they should be applied to all the wheels, but when hand brakes are employed he would apply them to one end of the cars only, unless the latter were used on heavy grades.

Mr. KIRBY, of the Lake Shore & Michigan Southern Railway, wrote that he thought continuous brakes for freight trains were very desirable, but was afraid that if they were adopted each road would use a different kind, and thus it would afford another occasion for diversity in patterns. He said further: "As an illustration of the proneness of men not to have anything like his neighbor, two journal-bearing patterns had to be made recently at one of our shops. These were both for what a casual observer would call Master Car-Builders' boxes. The journals were of the Master Car-Builders' standard; but the patterns had to be made, one 4 in. wide, the other 4¼ in. The Master Car-Builders' standard is 4½ in. These two patterns increased the number of patterns for journal-bearings which must be kept on hand to 47, and with this large number it is not infrequent that a journal-bearing is used that does not fit the box, but is the nearest that we have. Every man seems to have a standard of his own."

He expressed the opinion further that it would be economy to use brakes on all the wheels, as the retarding power could thus be increased and the liability of sliding the wheels diminished.

He also advocated the adoption of uniform brake-heads and shoes for all freight cars, but was not hopeful that it could be brought about.

Mr. ORTTON, of the Canada Southern, wrote that he was in favor of having brakes applied to all the wheels, and gave very nearly the same reasons as Mr. Kirby did. He said further: "Regarding the economy of having a uniform brake-head, whether with or without a shoe, there cannot be two opinions on the subject; but then the question arises, 'Whose brake-head is the best?' On that question there exists a diversity of opinion, and like all other suggestions involving a uniformity of action, there is not much likelihood of securing a universal decision; and, I fear, the same will occur down to the end of time, or while we build cars after the present fashion."

Mr. TALLMAN was called on to give some information about his brake. He expressed the opinion that a train brake should have power at all rates of speed, and that it should not require any connection between the cars. Air brakes cannot be run in a mixed train. Five cars equipped with his brake had now been on the Harlem Division of the New York Central Railroad for some time, and ten stock cars for the New York Live Stock Express Company have just been completed and are supplied with it. In applying the brake he said that the engineer has simply to slack his engine and the momentum of the car applies it.

BRAKE SHOES.

Mr. SNOW, of the Ramapo Wheel and Foundry Works, spoke on the subject as follows: "It has been thoroughly demonstrated that the number of flat wheels removed from freight cars using four shoes is far greater in proportion to the number in service than those removed from passenger cars using eight shoes. Many railroad officials who have given the subject any attention claim 10 to 15 per cent. more removals of flat wheels under freight than passenger cars in ratio to the number in service. The necessity of using brake shoes on all the wheels of freight cars will also be apparent to the officers of all the roads running long trains, especially those using 20-ton cars. It is quite evident that it requires much more resisting force to stop a car loaded with 20 tons than one of less weight. It is also a fact that freight trains are moved at a higher rate of speed (notwithstanding the regulations of the road to the contrary) than formerly, and the trains often follow each other in dangerously close proximity. In order to meet the exigency of the times, and the better to provide against rear collisions, it becomes necessary to have the best brake appliances that can be devised, and the numbers to be increased in ratio to the tonnage and speed of the trains.

"The economy of having a uniform brake-head and shoe is simply a question of dollars and cents, and can be illustrated by facts and statistics better than any other way. There are in the United States and Canada not less than 300 patterns of brake-shoes. We have at our works 182 patterns, which include only those now in use in the coast states and east of Ohio. Every road has to keep a stock of brake-shoes on hand to supply the different wants required for the equipment they have to handle.

"There were in service prior to the year 1881 19,982 locomotives, 20,253 passenger, baggage and combined cars and 593,412 freight, coal and service cars. The estimated equipment built and contracted for in 1881 is 1,500 locomotives, 45,000 freight cars and 1,500 passenger cars.

"Many of the roads have recently adopted eight shoes on their freight cars. Allowing but four shoes on each engine and freight car and eight on each passenger car, we have a total of 2,585,580 shoes in service. The average weight of shoes, including those with combined head, would not be less than 24 lbs. each, which gives a grand total of 62,053,920 lbs., which, at two cents per lb., equals $1,241,078.40. Some railroad officers claim they carry only 5 per cent. of their brake-shoes in stock for all renewals, but admit frankly they could get along with 1 per cent. provided they had uniformity in pattern of shoe. Admitting this to be true, we have 4 per cent. of $1,241,078, which equals $49,643.13, which might be saved by the adoption of uniformity.

"The principal question before you, and the most difficult one to be settled is, What pattern of shoe shall be adopted? The tendency in all cases like this is that most officers are liable to use their influence to have something adopted that shall conform to the equipment of their roads.

"In selecting a shoe for general service several things are to be considered, the construction of the pattern as to cheapness and strength, its adaptability to being easily replaced, and its having no unnecessary weight of metal to be thrown away when the shoe is worn out. I take the liberty to present for your consideration this evening a brake-shoe which has an improvement on the Christie shoe. This shoe has been adopted very generally by the roads of the country. From our Eastern works alone we are furnishing them to 24 different roads and probably as many more roads are supplied from the Western works. The Christie shoe is patented and the patent expires Sept. 12, 1882. Therefore, it has but a few months to run, and could probably be bought very low if parties could not wait until next September before adopting. The improvement suggested has not been patented, and the device is very easily applied and does not interfere with the old heads already in use. There is quite a difference in the heads of the Christie shoe, as used by the different roads, yet many of them are so nearly alike that the old heads may be utilized by chipping the corners or bearing points of the shoe. The strengthening piece as applied to the Christie shoe is also desirable for any other form of shoe. Our experience proves that a shoe should rest only on each end of the head. The beating of the shoe by the application of the brake and the subsequent contraction causes the shoe to curve to a less radius, and on its next application it practically touches only on each end, consequently there is a bearing at the centre, and applied suddenly and forcibly the shoe is liable to break. The Christie shoe has a bearing only at each end, which commends itself to your favorable notice. We find that there is little difference between the weight of the "combined head and shoe," and the head and shoe separate. They will range from 32 to 40 lbs. We have the Christie head and shoe at 16 lbs. each. The lightest combined head and shoe is used by the Pullman Company and weighs 32 lbs.

"We would recommend, in changing to the Christie shoe, to use a malleable-iron head, which can be made to weigh about 6 lbs., and by that means can be furnished as cheaply as a cast-iron head.

"In regard to parts requiring the most frequent renewals, I would suggest the safety and economy of using a shoe composed of cast iron and wrought iron combined. Its safety consists in the fact that the combination of metals will always take hold of the wheel in winter or summer, wet or dry, with equal tenacity, and always do its duty with promptness and uniformity. Its economy consists in its recovering qualities and its value in prolonging the life of wheels. While it takes firm hold of the wheel and brings the train under prompt control, it does not fasten to or amalgamate itself with the wheel and cause it to slide, like some metals that are used for the purpose. The action is peculiar to the combination of the shoe. When applied the particles of gray iron are worn off by the wheel and taken up as it passes the wrought iron, where it is held in suspension and made not only to do double service, but effectually prevents the shoe from fastening itself to the wheel, as in frequent cases with other metals.

"Its economy also consists in its longevity of service. More than one hundred roads have given this device a separate and careful test with the most remarkable and satisfactory results, although not uniform: yet the lowest tests, as against cast iron, have been as three to one, except in two cases where they were 2½ to 1, and the highest tests are seven to one, thus confirming the fact that the combination shoe will outlast more than four times the common cast-iron shoe.

"Therefore should the statistics of the number and weight of brake-shoes which are mentioned, be applied to the economy of using the combination shoe, it would show such a remarkable result as to be almost incredible."

Mr. ADAMS asked how long the patent of the Congdon shoe has to run.

Mr. SNOW replied about twelve years.

Mr. ADAMS, of the Boston & Albany Railroad, expressed the opinion that a car with brakes applied to all of the eight wheels could be stopped in half the distance that one could with brakes on four wheels only. The authorities of the Boston & Albany Railroad had experimented on the matter and were satisfied that a saving would result by applying the brakes to all of the cars. The Fitchburg Railroad authorities have reached the same conclusion.

He also advocated the use of a lever for operating hand-brakes instead of a wheel, and said that many brakemen lose their lives in consequence of the wheels breaking. On the road with which he is connected a lever had been used considerably, but recently one of another and improved design, and no more wheels will be put on new cars.

He also reported that they had made a trial of the Congdon brake-shoe, and said that they were then running on the fifth set of cast-iron shoes against one of the former.

After some other desultory discussion the meeting adjourned.

The Central Vermont Case.

The following extract is from a letter which appeared in the Boston *Transcript* of Feb. 28; it contains a pretty plain statement of the Central Vermont case, and is signed "F A. B.," the initials being those of Mr. Francis A. Brooks, President of the Vermont & Canada Company:

Some 17 years ago the stock of the Vermont & Canada Railroad Company was at or above par in the market, and was yielding 8 per cent. per annum as rental of the road leased to the Vermont Central Company, which rental was represented as being a first charge upon the net earnings of the two roads, about 180 miles in length, fully completed and equipped at an actual cash cost of about $9,000,000. These two roads, called the "Vermont Central Line," had been placed (by a supposed decree of the Court of Chancery) in the hands of J. G. Smith and two other persons to manage, for the purpose of taking the net earnings and applying the same—first, to the payment of the Canada rent, and next to the interest of the first-mortgage (Vermont Central) bonds. These payments were fully made down to June 1, 1872, since which time no rent or interest whatever has been paid to the original security holders.

During this period the managers, acting ostensibly as the receivers or officers of the Court of Chancery, had undertaken operations outside the line of the Vermont Central road, and upon their own motion as pretended receivers of the Court, and, by so doing, had run up a debt of between four and five million dollars, and had rendered themselves personally liable for a portion of this debt.

To protect themselves from this individual liability, and to bolster up their credit as borrowers, they employed the net income until July, 1876, so far as it was necessary, to keep down the interest of their own debt, and the residue for purposes wholly foreign either to the interests of the Vermont & Canada Company or the first-mortgage bondholders. The managers had in 1872 procured a charter in the name of the Central Vermont Railroad Company, professedly for the purpose of absorbing the old mortgage bonds by issuing capital stock for that purpose; but they organized that company in 1873 on the basis of *cash subscriptions only*, and never thereafter opened books of subscription for stock payable in mortgage bonds, lest they might by so doing lose control of the corporation. Having so organized their new company, they went to Chancellor Royce with an application that this new company be placed in possession of the two railroads, as Receiver of his Court, which was granted, against the remonstrance of both the Canada Company and the bondholders.

In 1876 this Central Vermont Company, thus holding possession of the roads in fiduciary capacity, brought its suit praying that both the roads be sold to satisfy the indebtedness of the management itself, and free of all mortgages or leasehold claims. The Central Vermont Company was defeated in that suit; and just a fortnight later it started a second suit, again asking the Court to sell the two roads to

satisfy the managers' debts, or, if the Court should refuse to make such sale (as it once had already done), then asking the Court to appropriate the *income* of the roads to that purpose instead of the roads themselves. This suit is now known as the Langdon case. Governor Smith was used as a witness and testified that he understood, and everybody interested in the property also understood, that the debts contracted by the managers (who were ostensibly, though not really, the officers of the Court) operated to create a first charge or lien upon the property of both railroads, having precedence over all pre-existing mortgages or liens thereon. Though this testimony was known by the defendants to be contrary to the fact, and was supposed by them to be also incompetent and insufficient in law for overriding mortgage liens or charges upon the property, yet it seems to have been accepted by the Court as sufficient to obliterate a mere mortgage security, since the Court sustained the claims of the orators in this behalf by a decision announced through Judge Royce in December, 1880, now published in the fifty-third volume of Vermont Reports.

During all this time Governor Smith had been one of the first-mortgage trustees, as well as one of the pretended officers of the Court in charge of this property as such; and by this decision of the Supreme Court he has, if this decision shall prevail, apparently accomplished the ruin and destruction of the trusts reposed in him and his associates both as an officer of the Court of Chancery acting for the Canada Company and as first-mortgage trustee for the bondholders, after keeping them out of all income from their property since June 1, 1872.

The net income of these two trust roads, so-called, which went into the hands of the managers, for the 7½ years ending Dec. 31, 1880, amounted in all to $3,207,234.22, or a yearly average net income of $427,631.23.

Of this net income the managers (Central Vermont Company) employed $457,500 (by leave of Chancellor Royce) in purchasing a controlling interest in the capital stock of their own company, then outstanding in the hands of persons opposed to the management, and thereby Governor Smith was enabled to retain the control of the Central Vermont corporation and of all the income of the two trust roads to the present time, and to deal with such net income according to his own will and pleasure.

Probably no such palpable violation and abuse of important trusts has ever been perpetrated in this country by men laying any claim to respectability, and it could not have been continued so long in the state of Vermont without the countenance and support of the Court of Chancery claiming to have jurisdiction over these managers as its officers.

Transportation in Congress.

In the Senate on the 2d:

Mr. Sawyer, from the Committee on Post-offices, reported favorably, with an amendment, the bill to provide for the payment of the amount due the Burlington, Cedar Rapids & Northern Railway Company for transportation of United States mails.

Mr. Gorman offered a resolution directing the Postmaster General to transmit a statement giving the amount expended during the fiscal year ending June 30, 1881, for special facilities for fast mails, a list of railroad companies receiving the same and the amount paid to each company, the additional service to each company, if any, and to what extent the service has been expedited; also a detailed statement of contracts made for special fast mail facilities during the present fiscal year to date; the amount to be paid to each railroad company, and the character of the additional service to be performed by each company. Adopted.

In the House on the 8th:

Mr. Ainsley, from the Indian Affairs Committee, reported a bill to ratify an agreement by the Shoshone and Bannock Indians for the sale of part of their reservation in Idaho to the Utah & Northern Company.

RAILROAD LAW.

Massachusetts Railroad Legislation.

The Railroad Committee of the Massachusetts Legislature has reported a bill to establish a railroad tribunal. It provides that two of the county commissioners of each county through which a new railroad is to be built by new railroad corporations organized under the general law shall, with the railroad commissioners, constitute a special tribunal to determine if the public exigency demands said road. In the County of Suffolk the Board of Aldermen shall take the place of the county commissioners. Whenever the proposed route is wholly within the limits of one city or town, two of the aldermen or selectmen of such place shall act in place of the county commissioners. If this tribunal decides that the public exigency does not demand such a road, no further proceedings shall be had. If the tribunal decides favorably, further proceedings shall be held under the general law. The petitioners for a location are to pay all the expenses of the special tribunal.

Bills are also pending to provide for an appeal from county commissioners to the railroad commissioners in case of grade crossings, and to authorize the formation of relief societies by the employés of railroad and steamboat companies.

The Railroad Committee has also reported against any change in relation to the law on color-blindness, and against legislation relating to safety drawbars and couplings for freight and merchandise cars.

Iowa Railroad Legislation—Train Robbers.

The Iowa Senate has passed the following bill:

Sec. 1. If any person shall willfully and maliciously uncouple, or detach the locomotive or tender, or any of the cars of any railroad train, or shall in any manner aid, abet, or procure the doing of the same, such person shall be punished by imprisonment in the state penitentiary not exceeding five years, or by fine not exceeding $1,000, or both, at the discretion of the court.

Sec. 2. If any person shall unlawfully seize upon any locomotive, with or without any express, mail, baggage, or other car attached thereto, and run the same upon any railroad, or shall aid, abet, or procure the doing of the same, such person shall be punished by imprisonment in the state penitentiary not exceeding ten years, or by fine not exceeding $2,000, or both, at the discretion of the court.

Sec. 3. If any person shall, without permission of the proper authority, wrongfully take or run any hand-car upon any railroad in this state, he shall be deemed guilty of a misdemeanor, and on conviction thereof shall be fined not more than $100, or imprisoned not more than thirty days, or both, at the discretion of the court; provided, that if by such unlawful use of any hand-car, any locomotive or car is thrown from the track, or a collision produced, or any person injured thereby, he shall, on conviction, be imprisoned in the penitentiary for a term of not more than five years; and provided further, that if by reason of such unlawful use of any hand-car any person is killed, such person offending shall be deemed guilty of manslaughter.

The House will amend it by adding another section, which was accidentally overlooked in the Senate, providing a penalty for interfering with the air-brakes on coaches.

Railroad Consolidation in Ohio.

In the suit of the State of Ohio on relation of George K. Nash, Attorney-General, against the Ohio Railway Co., Wm. H. Vanderbilt and others, in *quo warranto*, the Ohio Supreme Court holds as follows:

1. Two railroad companies owning lines of railroad only connected by other railroads which such companies hold by lease are not authorized to become consolidated into one corporation under Revised Statutes, section 3,379.

2. The lines of two railroad companies being in their general features parallel and competing cannot be connected for the carriage of freight and passengers over both continuously within the meaning of Revised Statutes, section 3,379, and hence such companies cannot become consolidated into one corporation under that section.

3. The certificate made by the directors of consolidating railroad companies, under Revised Statutes, section 3,381, which fails to show any place of residence of the directors of the new company, is fatally defective. Judgment of ouster.

Condemning Public Property.

In Woodward and others against the Macon & Brunswick Co., the Georgia Supreme Court has just confirmed the decision of the lower court refusing an injunction against the use of a certain part of a cemetery in Macon. The Court held as follows:

1. The sale of the Macon & Brunswick Railroad is valid and binding upon the state, and equity would hold the title good in the purchasers, though all the regulations prescribed for the manner of conducting it had not been literally complied with, if carried into execution substantially by the executive, the purchase money having been largely paid, and the transaction virtually ratified by subsequent acquiescence of the legislative department. Under such circumstances the case must be strong indeed to authorize judicial interference with the sale.

2. By the lease and subsequent purchase of the road and its franchise the present company, known as the Macon & Brunswick Railroad Company, acquired the right to extend and construct the road from Macon to Atlanta, subject to the limitations in the original and amended charters of the company, subsequent legislation thereon, and the constitutional guarantee to the owners of property not to force them to part with any portion of it without just compensation.

3. Though the state may have previously dedicated property along the direct line of said extension to other public uses, it has the reserved right to appropriate a necessary portion of it to other public use, provided such appropriation be made by express grant or necessary implication that such grant was intended; for having parted with it for one public use, in the absence of such new grant, the presumption would be that it had not made another inconsistent with the first.

4. If therefore the state herself had dedicated the ground embraced within the limits of the cemetery at Macon to the use of the public as a burying place for the dead, and the track of the proposed extension in the most direct line from Macon to Atlanta passed along the edge of the cemetery adjoining the Ocmulgee River, and was not inconsistent with the prior use of the grounds for a cemetery, but passed over ground wholly unsuited to such use, the implication would be strong that the grant to construct the road on such direct line, not being in conflict with the prior dedication, included the grant to pass over such unnecessary part of the cemetery.

5. But where the city of Macon herself had dedicated the ground to the cemetery for herself, and by contract with the railroad company, and for a valuable consideration had granted to the company the right of way through a portion of the former dedication not adapted to the former use, and not interfering with any private lot conveyed by her to private persons, then it is clear that no such private person would be equitably entitled to interfere with the grant impliedly given by the state, and expressly ceded by the city. This is especially so when such use will enure, in the judgment of the city, to the greater security of the former use and general ornamentation of the cemetery. The particular improvement and adornment of his own lot is for the private judgment and taste of the owner; the adornment of the entire grounds is for the city speaking through her authorities, particularly when they speak, as is conceded, the overwhelming voice of the citizens.

6. Delay in applying for the writ of injunction until large expenditures have been made in acquiring the right of way on the line to the cemetery and in work done within it, and without notice to the company of any intention to make application therefor, will make equity more loth to stay the further progress of the work. The writ is designed to prevent, not to undo; and, without strong reason therefor, if delayed until progress of heavy cost has been made, the application should not be granted.

7. Facts in dispute, with conflicting affidavits, are for the Chancellor, and unless his judgment thereon shows an abuse of discretion, this Court does not interfere. In this case his judgment is overwhelmingly sustained.

THE SCRAP HEAP.

Locomotive Building.

The Virginia Midland shops in Alexandria, Pa., are building two ten-wheel freight engines for the road.

The Rhode Island Locomotive Works in Providence last week delivered a heavy mogul freight to the Cheshire Railroad.

The firm of Wm. E. Tanner & Co., of Richmond, Va., has been reorganized and incorporated as the Tanner & Dulaney Engine Co. The company will build extensive shops just outside of Richmond, and will build locomotives as well as stationary engines and other machine work.

The Grant Locomotive Works at Paterson, N. J., are building a number of engines for the Richmond & Allegheny road.

The Baldwin Locomotive Works in Philadelphia last week shipped several engines to Morgan's Louisiana & Texas road.

The Schenectady Locomotive Works in Schenectady, N. Y., are now running on an order for 40 engines for the Lake Shore & Michigan Southern road.

Locomotive Tests.

Fontaine Engine No. 2 has been sent to the Detroit, Lansing & Northern road, where it is to have a trial.

Car Notes.

The Michigan Car Co. in Detroit has taken a contract to build 2,000 box cars for the National Car Co. Delivery will begin in April.

The Central Vermont shops at St. Albans, Vt., are building two new passenger cars, a wrecking car and a number of freight cars.

The Youngstown Manufacturing Co. at Youngstown, O., has an order for 24,000 car-journal bearings for a firm in Columbus.

The car shops at South Pittsburgh, Tenn., now owned by the Tennessee Coal, Iron & Railroad Co., are to be enlarged and improved.

A train now under construction for the steamboat line between Boston and Stonington is to be fitted with Graydon safety heaters and lighted with gas. It is claimed that these improvements will do away with risk from fire in case of an accident.

The Philadelphia & Reading shops at Reading, Pa., are building 100 new eight-wheel coal cars for the road.

The Boston Stock Car Company have been organized in Boston with $500,000 capital stock, for the purpose of building and leasing stock cars.

The Youngstown Car Works at Youngstown, O., are to be enlarged.

The Richmond & Danville shops in Richmond, Va., are building a pay car, two combination and two baggage cars for the road.

The Ensign Manufacturing Co. at Huntington, W. Va., is at work on an order for 1,000 box cars for the Chesapeake & Ohio road.

The Gilbert & Bush Co. at Troy, N. Y., has lately delivered 12 passenger, 3 combination and 3 baggage cars to the Chesapeake & Ohio road.

The Virginia Midland shops at Alexandria, Va., are building a number of new cars.

The Wason Car and Foundry Company at Chattanooga, Tenn., is building 300 box cars for the Richmond & Danville road.

The Tredegar Company in Richmond, Va., is building 100 stock cars for the Chesapeake & Ohio and a large number of freight cars for the Richmond & Allegheny road.

The St. Paul *Pioneer-Press* thus describes a car built under a patent of T. L. Wilson, of Port Hope, Ont., which was lately in St. Paul: "It carries with ease 900 bushels of wheat or 16,000 ft. of lumber. Below the bottom of ordinary box cars the car carries 300 bushels of wheat in a lower apartment, which not only gives an immense amount of room, as will be seen, but also steadies the car. The car is 34 ft. long by 8 ft. 6 in. wide. Its weight is 27,000 lbs. and can load 54,000 lbs. The loading is done by spouts and the unloading by a false bottom, which is regulated by a lever and admits of a car of grain being sent out in 40 seconds. It is also especially adapted by its length, width and plan for a lumber car, and the doors in the end make it convenient for handling such cargo."

Iron and Manufacturing Notes.

J. S. Mundy, engine builder, at Nos. 22 and 24 Prospect street, Newark, N. J., is building for the Philadelphia & Reading road a traveling carriage to be used in the Philadelphia freight yard for lifting and transferring heavy freight. The carriage will travel 90 ft. on a heavy trestle built for the purpose. The power will be furnished by a Muudy double-cylinder patent friction compound geared engine of 25 horse-power. It will be finished about April 1, and the required test is that it shall take up a weight of 20 tons and carry it back and forth 90 ft. It is a compact and complete machine.

The LaBelle Iron & Nail Co., of Wheeling, W. Va., has bought a large tract of iron land at Possum Valley, 11 miles from Birmingham, Ala., and is preparing to build a blast furnace there.

The Cambria Iron Co. at Johnstown, Pa., is making 20,000 tons of steel rails for the Baltimore & Ohio road.

The Cleveland Rolling Mill Co. has large contracts for steel rails for the Cleveland, Columbus, Cincinnati & Indianapolis and the Indianapolis & St. Louis roads.

The Pittsburgh Steel Casting Company is putting up a universal blooming mill, which will make blooms or slabs of any size up to 30 in. wide.

The new rolling mill of Summers Brothers & Co. at Struthers, O., is nearly finished.

Carnegie Brothers & Co. in Pittsburgh are building a universal mill for rolling large steel plates for bridge work.

The Poplar Creek Coal & Iron Company has been organized at Knoxville, Tenn., with $1,000,000 capital stock. The officers are: G. J. Foreacre, President; C. E. Luckey, Vice-President; T. D. Flippen, Secretary; E. F. Wiley, Treasurer. The company will mine coal and build furnaces on a tract of 20,000 acres of land which it owns.

No. 1 Furnace of the Albany City Iron Works in Albany, N. Y., recently started up after a half-year's rest.

A large addition is being built to the blower works of B. F. Sturtevant & Co. at Jamaica Plain, Mass. Over 3,000 blowers were made last year.

The blast furnace of the Leland Iron Co. at Leland, Mich., went into blast recently and is now making charcoal car-wheel iron.

The Denver Furnace & Rolling Mill Co. has been incorporated at Denver, Col., with $2,000,000 capital stock.

The Rail Market.

Steel rails are quiet and weak at $56 to $58 per ton at mill, and it is said that $55 has been accepted for large orders.

Iron rails are quiet but steady at $48 to $52 per ton at mill, according to section, with many small sales reported.

Spikes are steady at $3.15 to $3.25 per 100 lbs.; fish-plates, $2.60 to $2.80; track-bolts, $3.75 to $4.25, according to specifications.

There is some inquiry for steel blooms and sales are reported at $45.50 to $46 at tidewater, duty paid.

Old iron rails are in light demand at $29 to $30.50 per ton in Philadelphia. Crop ends (steel) have been offered at $27 per ton.

Bridge Strain-Sheets.

A correspondent asks the following question, which many of our readers may are doubtless to answer:

"Will some of your experienced subscribers favor us with a copy of a strain-sheet, say of any common form of bridge truss from 100 to 200 ft. span, showing the strains in the various members and the method of calculating them for permanent and rolling load, as used in every day practice? I fail to find this exemplified or given in any of the usual text-books, yet a strain-sheet is often called for, and should accompany all bridge proposals."

A Brave Fireman.

Al. Millner, fireman on a freight engine of the Pittsburgh, Fort Wayne & Chicago Railroad, performed a brave act the other day, by which he saved the life of a young man named Frank Fisher, at the risk of his own. As Millner's train was passing through Freedom, Pa., Fisher endeavored to cross the road in front of the engine, when he was struck and thrown across the beam of the cow-catcher, with his feet almost under the wheels. Millner ran out along the footboard and held the boy until the train was stopped, although he was in imminent danger of being drawn under the wheels owing to the peculiar position of the body. Fisher was insensible when removed from the engine, but recovered consciousness in a short time and was found to have sustained no very serious injuries.

A Terrible Collision.

There was a collision on the Kankakee & Seneca just west of Gardner the other night. Special velocipede No. 1 coming east met special velocipede No. 2 going west on a high fill. The driver of No. 2 discovered the other velocipede when within a few machine lengths and sounded a wind alarm and turned on his brake with full force. No. 1 came on at the rate of 45 telegraph poles an hour, all unconscious

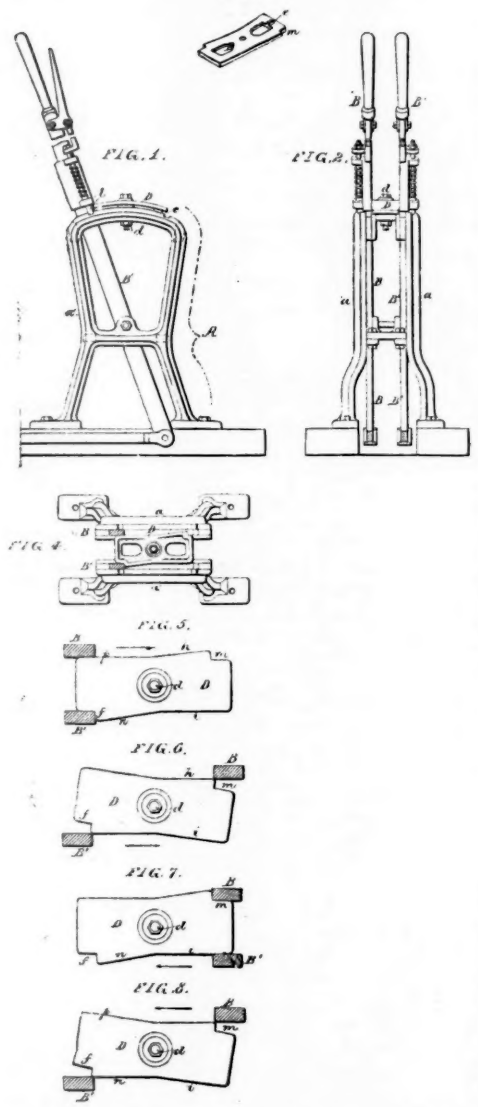
of the disaster impending. He had just time to show No. 2 the whites of his eyes and to utter the customary, "My God, Jim, we are lost!" when the two 'locerpedes came together with a crash which was plainly heard at a distance of ten feet. The unhappy driver on No. 1 rose gracefully but suddenly into the air and landed against the fence alongside the track amid the wreck of his machine, where he might have stayed until now so far as the man on the other machine was concerned, who after swearing around a while and calling the much broke-up victim a "blasted idjot" and other tender and sympathetic names, got back on his machine and solemnly pumped away into the blackness of the night. The feller in the ditch took stock of his injuries and found that his draw-bar was bent double, his jacket ripped off and his sand gone. We suppose the accident was the "train dispatcher's fault" again.—*Kankakee (Ill.) Gazette.*

Johnson's Interlocking Switch and Signal.

The object of this invention, recently patented by Edward H. Johnson, of Philadelphia, is to prevent the opening of a switch without first giving the danger signal, and to prevent the giving of a safety signal without first closing the switch.

The apparatus consists of a frame *A*, formed of two castings *a a'* connected together, and fastened to the track. To this frame are pivoted the two levers *B B'* the former being connected to the danger-signal and the latter to the switch. Each of these levers has a spring latch, similar to that used

FIG. 3.



on the reversing lever of a locomotive, by which the lever may be locked in either of the two positions to which it has to be moved.

A safety-plate *D* is pivoted by a pin or bolt *a* to the top of the frame, and has on the under side a projection *e*, fig. 3, which, coming in contact with the frame, serves to limit the movement of the plate. The character of this plate and its relation to the switch and signal levers for the purpose of effecting the desired object can be best explained by reference to the views figs. 5, 6, 7 and 8. In fig. 5 the switch-lever *B'* fits in a notch *f* in the safety-plate, on one edge of the same, and the signal-lever *B* being in contact, or nearly so, with the opposite edge of the plate, the latter cannot turn on its pivot, and the switch-lever will consequently be locked by the notch *f*. This is the condition of the levers and safety-plate when the switch is closed and the continuity of the main line uninterrupted.

Should it be necessary to give the signal of "danger" due to other causes than an open switch, the signal-lever *B* can be operated without disturbing the switch-lever *B'*; but in order to release the latter the signal-lever *B* must be moved to the position fig. 6, in doing which it will so act on the inclined edge *h* of the safety-plate as to turn the latter on its pivot, as in fig. 6, and thus release the switch-lever, and permit it to be moved to the position fig. 7, in doing which the lever *B'*, bearing against the inclined edge *i* of the plate, will turn the latter to the position fig. 7, where it will be observed that the signal-lever *B* is locked in the notch *m* of the plate, which cannot be turned, owing to the switch-lever. This is the condition of the levers and safety-plate when a switch has been turned to a siding and the main line is not in a condition to be traversed by trains, this being indicated by the danger-signal, which cannot be disturbed as long as the switch is thus open. On moving the switch-lever *B'*, however, in the direction of the arrow, fig. 7, so as to close the switch, the said lever, bearing against the inclined edge *n* of the safety-plate, will turn the latter, as shown in fig. 8, thereby releasing the signal-lever, which can be returned to the position fig. 5, in doing which the signal-lever, acting against the inclined edge *p* of the plate, will turn the latter, and the switch-lever will be locked as before, the signal indicating that the main track is clear for the travel of trains.

It will be seen, without further description, that the continuity of the main track cannot be interrupted by opening the switch without first giving the danger-signal, and that a safety-signal cannot be given without first closing the switch and restoring the track to a condition for the travel of trains.

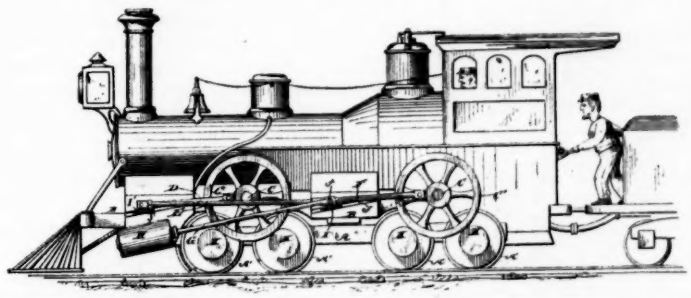
The inventor claims as his invention—

"The combination of the switch-lever *B'* and signal-lever *B* with the pivoted safety-plate *D*, constructed to directly act on and to be directly operated by both levers, substantially as described."

The patent has been assigned to the Wharton Railroad Switch Company, of Philadelphia.

Hudson's "Improved" Locomotive.

The ingenuity of American inventors of locomotives is irrepressible. Not only does their genius soar in classic Boston, as was shown in these pages two weeks ago, but on



the wild plains of Texas it is equally venturesome, the creative fire having this time descended upon a denizen of "Bear Creek," Ben. F. Hudson by name.

The object of the invention, it is said in the specification, is "to attain a maximum of speed with a minimum of power," an end which is certainly very desirable. Just how the inventor is able to "beat" the law of the correlation of forces is not explained in his specification.

Whether the plan of engine which Mr. Hudson has patented will be adopted or not we will not be rash enough to predict, but we will venture to hope that the construction of fireman, which he has designed and shown in his drawings, will not be imitated.

The Eads Ship Railway.

A dispatch from Washington, March 4, says: "The Senate Committee on Commerce this afternoon authorized Mr. Vest to report the Eads Ship Railway bill, with a recommendation for its passage with sundry amendments. The bill as amended provides for a guarantee by the United States of a dividend of 6 per cent. per annum for 15 years on $50,000,000 of the capital stock of this company, the total capital stock being $75,000,000, and stipulates that the company shall transport gratis, for 99 years, the mails, war vessels and all other property of the United States, and shall transport American merchant vessels for one-half the rates charged by the company on all the commerce except that of Mexico. It is further provided that for any advances made by our government under its guarantee the company is to give its bonds, payable in 15 years, without interest, which bonds, in the event of their non-payment at maturity, are to be receivable for tolls on any American vessel, with 10 per cent. added to their face value. The guarantee is to attach to the extent of $5,000,000 when 10 miles of the ship railway and the terminal works connected therewith shall have been completed and tested in the presence of government engineers by the safe transportation of a loaded ship weighing 2,500 tons from the harbor to the terminus of the said 10-mile section and back again at an average speed of six miles per hour. Another $5,000,000 is to be guaranteed when another 10-mile section, with the necessary terminal works, shall have been completed and tested at the other end of the railway. A commission of engineers appointed by the President is then to examine the intermediate portion of the route and report whether or not the completion of the ship railway over it is practicable, at a cost not exceeding $60,000,000. If the commission reports in the affirmative the government guarantee is to attach (for the remaining $40,000,000 of the $50,000,000 of stock to be guaranteed) in accordance with the successive completion of the intermediate sections of the line. If the commission, however, reports in the negative the bill provides that no further guarantee shall attach until a loaded ship weighing 4,000 tons shall have been safely transported over the entire line from ocean to ocean. The bill also provides that in determining the amount for which the government shall be liable under the guarantee, one-half of the gross revenues of the company shall be considered as net profit. On the motion authorizing the bill to be reported favorably no negative votes were cast, but some members of the committee reserved the right to offer amendments or to dissent from certain portions of the bill when it comes up in the Senate."

"Koptography."

S. K. Devereux, of New Brunswick, exhibited and explained, at a recent meeting of the Polytechnic Association of the American Institute, his new art called koptography, recently patented. Cherry, or other tolerably hard wood, is treated on and near the surface with any suitable "filler," and smoothly finished. It is stained preferably a very dark color. Then any designs, preferably hand-made and highly artistic, being drawn or stenciled thereon, the portion of the surface representing these designs is sunk by a rough-pointed instrument, worked by hand with a hammer or by any suitable machinery. The figured portion, with a portion of the adjacent plane surface, is then treated successively with shellac and gold size, and all which lies on the plane surface is wiped off. When the size is just sufficiently dried gold leaf is applied. The gold leaf is retained on the sized surfaces only, and is protected by its sunk condition from any wear in the wiping or other treatment of the work. The invention is being tested on some of our standard manufactures of wool work, including Stevenson's cars and Steinway's pianos. A picture of the landing of the pilgrims is being prepared by this process on a panel 6½ by 6 ft., for the steamer "Pilgrim," being built at Chester.

Melting Snow by Artificial Heat.

At the meeting of the Polytechnic Association of the American Institute, held Feb. 23, Mr. R. d'Heureuse read a paper, in which the theory of melting snow by artificial heat was exhaustively canvassed. The average weight of newly-fallen snow is six pounds per cubic foot. If the heat generated by the complete combustion of coal could be well utilized, one pound of coal would melt 26 cubic feet of snow. Snow one foot deep on a street 60 feet wide gives 316,800 cubic feet per mile. To melt this would require 6$\frac{1}{2}$ tons of coal, all the heat being utilized. A calculation was also submitted as to probable cost of wheeled furnaces, and storage thereof, as compared to the cost of removing snow by carts, giving 50 per cent. balance in favor of melting.

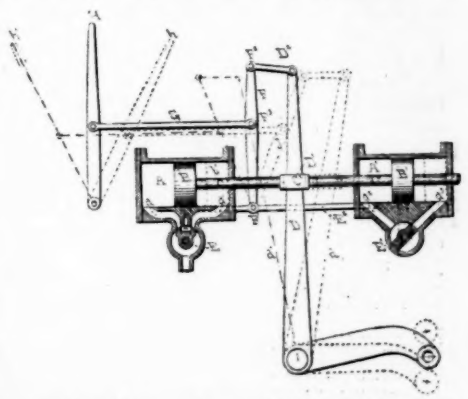
Good's Reversing Apparatus.

A reversing gear has been patented by William E. Good, of Reading, Pa., the action of which is described as follows in the specification:

"The cylinder *A'* is provided with two passages, a^2 and a^3, leading from opposite ends of the cylinder to the valve-box, which is provided with an oscillating valve *E'*, or its equivalent. The valves *E E'* are connected by arms on their spindles to the valve-rod E^3. This rod is operated by the lever *F'*, being connected thereto at *F'*, the opposite end F^3 being connected to the arm *D* by a link D^3. Intermediate between *F'* and F^3, at such point as will give the desired movement to the valve-rod *C C'*, I attach a link *G*, by a pin in F^3 to the lever *F*, said link being also connected to a lever *H*, or its equivalent, of the engine. At the point *D'* of the arm *D* provision is made for a free yet positive movement of the arm *D* between the ends of the mortise C^3 in the rod *C C'*.

"*h h'* in dotted lines indicate the forward and backward movement of the lever *H* or its equivalent, while *d d'*, indicate by dotted lines a corresponding movement of the arm *D*.

"When the lever *H* is moved toward *h* a movement will be communicated through the link *G* to the lever *F*, thence through the valve-rod E^3 to the valve *E*, by which movement steam pressure is admitted into the cylinder *A* by the port *a*, and will drive the piston *B* toward *a'* simultaneously with the movement of the valve *E*. By the direct connection of the rod E^3 there will be a corresponding movement of the valve E', by which communication will be opened between the ends of the cylinder *A'* by the ports a^2 and a^3, thus permitting the contents of the cylinder *A'* to pass with a limited velocity from one end of the cylinder to the other. The movements of the pistons *B* and *B'*, attached to the arm *D* by means of the rods *C C'* and mortise C^3, will continue so long as steam under pressure is admitted by the valve *E* into the cylinder *A* through the port *a*, and until the motion of the lever *H* is arrested. When the said lever *H* is arrested in its movement toward *h*, then will the point F^3 (which had been moving toward *f*) become for that interval of time a fixed point, and the still continued movement of the arm *D* toward *d* will move the lever *F* by its connecting-link D^3, and thus cause the steam valve *E* to close over the port *a*, and the valve *E'* to close over the port a^3, by which the movement of the arm *D* toward *d* is arrested, and the position of the arm *D* at *d* will be maintained so long as the lever *H* occupies its position at *h*. By a parity of motions,



when the lever *H* is moved toward *h'* and arrested at that point, then will the arm *D* be arrested at *d'*, the movement of the valves *E* and *E'* through the rod E^3 and lever *F* having operated in the reverse direction to that described, and opened and closed the ports *a'* and a^3 of the respective cylinders *A* and *A'*.

"The office of the cylinder *A'*, with its contents or the equivalent therefor, is to provide a suitable frictional resistance to the movement of the piston-rod *C'*, so that the movement of said rod may be adjusted to such speed or velocity as may be most advantageous to the operation of the machine.

"If, from leakage or any other cause, the movement of pistons *B B'*, rods *C C'*, and arm *D* should continue after the lever H had been thrown into position, then will the continued movement of arm *D*, through the link D^3 and fulcrum F^3 of rod *G*, reverse the movement of lever *F*, rod E^3, and valves *E E'*, and thus, admitting steam to the opposite side of piston *B*, will arrest the further movement of the arm *D*."

The claims are as follows:

"1. In a steam or automatic reversing device, the lever *F*, in combination with the valve *E* of the cylinder *A*, valve-rod E^3, link D^3, and arm *D*, as shown, for the purpose specified.

"2. The lever *F*, connected as shown, whereby the joints *F'*, F^3, and F^3 automatically become the fulcrum-points of movement, in combination with the valves *E E'*, cylinders *A A'*, pistons *B B'*, piston-rods *C C'*, arm *D*, link D^3, lever *H*, or its equivalent, rod or link *G*, and valve-rod E^3, substantially as shown, and for the purpose specified.

"3. In a steam or automatic reversing device, the automatic opening and closing of the valves *E E'* over their respective ports by the movement of piston *B* and arm *D*, in combination with lever *F*, link *D*, and rod E^3, substantially as shown, and for the purpose set forth."

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THE PENNSYLVANIA RAILROAD REPORT.

The general result of the operations of the Pennsylvania Railroad Company in 1881 were made known a month ago, by the publication of the gross earnings and expenses of all the lines east of Pittsburgh and Erie, and of the surplus over interest, etc., of the Western lines, on which we commented in our issue of Feb. 3. The full report, an abstract of which we publish this week, is therefore interesting chiefly for the information it gives concerning the traffic, the details of earnings and expenses, the expenditures for construction, etc., and the remarks the managers make thereon.

But while the report a month ago gave earnings and expenses for the system worked directly by the company, it did not for the lines west of Pittsburgh and Erie. We therefore give below the gross and net earnings of the whole system for eight successive years:

Year.	Gross earnings.	Expenses.	Net earnings.
1874	$62,938,351	$39,422,645	$23,515,706
1875	58,096,866	36,574,141	21,522,725
1876	61,561,211	39,495,737	22,065,474
1777	54,159,720	31,022,329	20,137,391
1878	55,426,963	33,611,034	21,815,929
1879	60,362,576	35,639,795	24,722,781
1880	70,764,062	42,179,485	28,584,577
1881	75,182,974	46,243,278	28,939,696

In everything last year exceeds all previous—very largely in gross earnings and expenses, very little in net earnings. Compared with 1880 there is an increase of $4,418,912 (6¼ per cent.) in receipts, of $4,063,793 (9⅝ per cent.) in expenses, and of $355,119 (1¼ per cent.) in net earnings. But compared with 1879 there is an increase of $14,820,398 (24½ per cent.) in receipts, of $10,603,483 (29¾ per cent.) in expenses, and of $4,216,915 (17 per cent., in profits.

Nothing shows more clearly how a great revival of business affects a railroad in both directions. We see here an increase of $14,800,000 in earnings in two years, with no important addition to mileage; but no less than $10,600,000 of this increase is absorbed by the increase of expenses; and from 1880 to 1881, while there was an increase of $4,400,000 in earnings, all but $355,000 of it is absorbed by the increased expenses. The increase in gross earnings was equal to nearly 6 per cent. on the stock; that in net earnings to less than ½ per cent.

The report heretofore published showed an increase of about $780,000 in the net earnings of the lines east of Pittsburgh and Erie. It follows then that the profits of the Western lines were less in 1881 than in 1880. The loss was wholly on what are called the Southwestern lines of that western system, namely, the Pittsburgh, Cincinnati & St. Louis and the lines worked in connection with it. The gross earnings of the lines were about the same both years, but their expenses were 12¼ per cent. greater last year, and there was a decrease of $937,643 (37 per cent.) in net earnings. On the other hand the Pittsburgh, Fort Wayne & Chicago and the other roads worked by the Pennsylvania Company show an increase of $475,819 (16.6 per cent.) in net earnings in 1881, their gross receipts having increased $1,528,426 (8.4 per cent). Further, the other western lines for whose debts the Pennsylvania Railroad is liable, or which it controls but does not work—the Vandalia Line, the Indianapolis & St. Louis and the Grand Rapids & Indiana being the chief—show a decrease of no less than 45½ per cent. in net earnings; it is only a comparatively small amount of the liabilities of these roads that the Pennsylvania is liable for, however.

Altogether the company made a profit on its lines west of Pittsburgh amounting to about $2,500,000 in 1881, and $560,000 less than the previous year.

The other great leased property, the United Railroads of New Jersey, which it works directly, makes a better showing than in any year of the lease except the Centennial year. The loss or profit under this lease has been, since 1873:

Year.		Year.	
1874	Loss, $31,161	1878	Loss, $1,136,775
1875	" 647,666	1879	" 939,889
1876	Profit, 1,127,422	1880	" 1,035,309
1877	Loss, 1,482,518	1881	" 302,865

As this improvement has been made in a year of high expenses and very low through rates, it gives reason to hope that this lease will soon cease to show a loss.

The leased Western lines yielded some profit every year except 1876 and 1877, amounting to more than $3,000,000 in 1880.

The earnings of the different roads were affected differently in 1881. Compared with 1880 the Pennsylvania Railroad Division has an increase of 6.4 per cent., the United Railroads of New Jersey an increase of 12.7 per cent., the Philadelphia & Erie a *decrease* of 7.5 per cent., the western lines worked by the Pennsylvania Company an increase of 8.4 per cent., the western lines worked by the Pittsburgh, Cincinnati & St. Louis an increase of only ¼ per cent., and the other western controlled lines a *decrease* of 3.8 per cent.

The lines which have the largest proportion of through traffic make the worst showing, as was to be expected. All the lines have large increases in expenses, however; the New Jersey roads, which have a large increase in earnings, expending 7¼ per cent. more than in 1880, and the Philadelphia & Erie, which has a considerable decrease in earnings, expending 3 per cent. more—all the other lines as much as 10 per cent. more.

The traffic of the whole system, east and west of Pittsburgh, has been, since 1874:

Year.	Passenger-miles.	Ton-miles
1875	562,514,468	3,335,797,675
1876	882,562,609	3,554,862,558
1877	543,097,170	3,640,222,819
1878	540,000,690	4,245,907,808
1879	583,776,686	5,334,194,434
1880	704,571,071	5,719,030,065
1881	811,181,668	6,604,667,188

The decrease in passenger traffic came to an end on these roads in 1878, when the traffic was the lightest for many years. The increase since has been rapid, 8 per cent. from 1878 to 1879, 20.7 per cent. from 1879 to 1880, and 15 per cent. from 1880 to 1881. In this latter year the traffic was stimulated for half the year by very low through rates. This growth in passenger traffic is an accompaniment of prosperous times, when people have a little money to spare.

The growth in freight traffic was not only great, but was greater than ever before in the history of the road, except from 1878 to 1879. Last year's increase was no less than 14¼ per cent. It was much larger in proportion on the Western than on the Eastern lines (19½ to 11¼ per cent.), but a considerable growth of freight traffic has been common on both.

The changes in the average rate, cost and profit, in cents per ton and per passenger mile, on lines east of Pittsburgh are shown below:

	Per passenger mile.			Per ton mile.		
	Receipt.	Cost.	Profit.	Receipt.	Cost.	Profit.
1878	2.309	1.712	0.597	0.939	0.545	0.394
1879	2.255	1.709	0.546	0 824	0.480	0.344
1880	2.222	1.674	0.548	0.918	0.540	0.378
1881	2.276	1.615	0.661	0.857	0.517	0.340

It is somewhat surprising to see that the average rate received per passenger-mile in 1881 was larger than in 1880 or 1879; and as lower average rates are reported on the two divisions which have nineteen-twentieths of the total passenger traffic, we think there must be some error here.

As it is, we have changed this average rate from 2.376 cents, as printed in the report, to 2.276, which is the result of dividing the passenger earnings by the passenger mileage. A decrease in the average cost is also reported, and the average profit reported is one-fifth larger in 1881 than in 1880 (reported two-fifths larger).

The average rate per ton per mile is nearly 7 per cent. less than in 1880; but, in spite of the great increase in the amount of expenses, there was a decrease in the average cost per ton per mile. This was, however, considerably more than the cost in 1879, when it was lowest. The profit per ton per mile is the smallest ever reported. If it had been as great as in 1880, the profits from freight would have been greater by $1,387,800. There was a reduction in the average freight rate and profit on all the divisions, but a reduction in cost only on the Pennsylvania Railroad and the New Jersey divisions, the Philadelphia & Erie showing a large increase.

The company has been engaged in some costly improvements, which are described in the report. The chief of them are the new Philadelphia station and the approaches to it, which have cost about $4,300,000—a work which may be compared with the "Fourth avenue improvement" in New York.

The report includes summary statements of the results of the operation of several eastern lines which the Pennsylvania does not work directly, but which it controls through the ownership of their stock—as the Northern Central, the West Jersey and the Philadelphia, Wilmington & Baltimore. These add greatly to the bulk of the report, which, though so long, does not go much into detail.

RAILROAD LAW IN NEW YORK.

From the eighty-fourth volume, just published, of the New York Court of Appeals Reports, we select a few decisions on railroad law which will be of interest beyond the limits of the state.

Duties of Directors.—In one of the cases a very complicated melange of facts presented a question which may be briefly stated thus: When one who is a director of a railroad company has joined as director in borrowing money for the company from himself or from a firm or banking-house of which he is a member, and in pledging bonds of the company to secure the loan, can the arrangement be repudiated on the ground that he could not thus aid in making a contract by which he was to benefit? And the decision is that it may be, but not without repaying the money actually loaned—with (we judge) lawful interest. The opinion says that whether a railroad director is to be called a "trustee" in a strict sense, or not, he certainly occupies a fiduciary position, being intrusted by other persons with powers which are to be exercised for the common interest and not for his private advantage. He is forbidden to abuse this confidence, and is disabled from dealing on his own behalf in any matter confided to him as director. And the company, or stockholders, can impeach any bargain he has made for his own benefit equally whether he did or did not act with honest intention. They are not required to show that he meant to defraud them. On the other hand, they must act honestly on their part. The rule was adopted to secure justice—to prevent wrong. It must not be applied so as to work injustice—to substitute one wrong for another. Allowing the company to keep the money borrowed while it repudiates the contract of pledge would be to turn a rule designed for protection into a weapon of offense and injustice. Hence the Court requires the money to be repaid as a condition of compelling the director to restore the bonds. It may be worth noting, in connection with this decision, that a Supreme Court Judge, in a case lately reported, has held that for a railroad president to hold a construction contract (even as trustee for others), and also to act as engineer to certify that the work has been done and the money is due, is grossly improper; also, that a railroad director who has participated in mismanagement which has led to a suit for appointment of a receiver ought not by any means to be appointed the receiver.

Construction.—The liability of companies for defects in the road-bed is illustrated by a case which arose in Albany. The tracks of the New York Central & Hudson River road cross a city street in which lies a horse railroad track. Repairs had been neglected at the spot, and there was a deep and dangerous hole. A man driving a wagon in which was also riding a friend of his, who went as guest or companion only, endeavored to cross, but the wagon wheel sank into the hole, and the wagon was jolted so violently as to throw out the guest, and he was killed by the fall. In a suit by his family against the company, one point of defense was that the city and the horse railroad company were also to blame for allowing the hole. But the Court said that the railroad company was in fault; and that it was no excuse for it that some one else

was in fault also. As to this, however, something may depend, in other cases, on the particular circumstances; if the license given by the city authorities to lay the tracks in the street casts the whole duty of repair on the city, or on the horse railroad company, perhaps a court would require the injured person to sue the party whose duty it really was to mend the break. Such licenses usually require the companies to make repairs; and there is a statute in New York to this effect. Another point of defense was that the driver need not have driven into the hole; therefore, there was contributive negligence. As to this the Court said that a guest or friend riding by invitation is not responsible for the negligence of the owner or driver of the vehicle; for the latter is not the guest's agent. Whether one who hires a driver is chargeable with his carelessness is another matter.

Carriage of Live Stock.—A train of the New York Central road took aboard a drove of cattle—undertaking only for transportation; the owner assumed all risks of loading and unloading, and of delay. Not far from Utica the train reached a spot where a flood had submerged the track. The engineer unskilfully ran the locomotive into the water, it became disabled, and there was a long delay of the train in consequence. Meanwhile the cattle suffered for want of food and water, and needed the relief of unloading. The agent who traveled in charge of them asked the conductor to move the train to a place where the cattle could be unloaded and cared for, but the conductor refused to do this. It was in his power to have done it by telegraphing to Utica for a fresh locomotive, but he seems to have considered that as the contract cast risks of delay, etc., and trouble of unloading, on the owner, the company was not bound to do this. The cattle were injured and the owner brought suit for damages. The decision is that the contract excused the company from the trouble of unloading the cattle, but not from the duty of bringing the cars to a stopping place at which the owner's agent could unload them. Therefore the conductor ought to have complied with his request. And the expense or difficulty or even impracticability of doing this at the time was no reason why the owner should not have damages, since the original cause of the stoppage was the carelessness of the engineer in running into the flood. The company was liable for the results of this mismanagement.

Injuries to Passengers.—New York courts have often decided that a highway traveler attempting to cross a track is bound to look and listen both ways for any coming train. Accordingly, when Miss Brassell was run over by a west-bound train of the New York Central road, while she was crossing the track just after alighting from an east-bound train, on which she had been a passenger (but the witnesses testified that she did not look out for the coming train before stepping on the track), the company's lawyer thought he had a clear case of contributive negligence. But the Court said that a company owes a higher duty to passengers than to highway travelers. It is bound to afford them safe means and opportunity of leaving the cars at the various stopping places, and is guilty of breach of duty in timing other trains so as to endanger them, unless proper cautions and safeguards are given. A passenger, while leaving a train, has a right to assume that the way indicated is kept safe for him, and is not necessarily negligent for not looking both ways, if such way lies across a track.

Who are Fellow Servants? often a perplexing question, is discussed in one case. On the Long Island Railroad the yard-master selects and employs the laborers required to aid him in making up trains, moving damaged cars to the repair shops, etc. The bumpers of one car were broken, and a man was busy, under directions from the yard-master, in attaching it to another so that it might be drawn to the shop, when the yard-master thoughtlessly gave signal for starting another train; it approached without giving warning; there was a collision and the workman at the couplings of the broken car was crushed. The yard-master was evidently careless. But the Court held that the company was not responsible. The laborer assumed the risks of his employment, including whatever might be done by the yard-master, except when he should be discharging in behalf of the company some of the duties which a master personally owes to his servants. The negligence of the yard-master was not in any sense that of the company. In directing the movement of the cars, the yard-master was not acting for the company in performing the company's duties, but was doing the work of a servant in the department of labor assigned to him as such. The case was therefore pronounced within the rule that the companies are not liable to one servant for the consequences of negligence of another when the two are employed "in the same general business." Under the new English law the company would be liable in such a case.

THE WINTER GRAIN MOVEMENT.

There have been some unprecedented features in the course of the grain movement since last fall, on some of which we have commented from week to week, as the reports of receipts and shipments brought them to light. The demoralization of railroad rates has been to a certain extent a disturbing element, because more contracts at very low rates were made by some of the roads than by others, and the roads making the lowest rates, or rather most of the contracts, carry to only part of the Atlantic ports, or carry mostly to two or three, and but little to others. But one common effect was to be expected from the low rail rates, and that was a great stimulation of the movement to the seaboard. These rates were lower than lake and canal rates usually are, and there was thus not the usual object in holding for the opening of navigation. Against this was to be reckoned a smaller surplus to be spared from the West than in any other year since 1876, and a light foreign demand. The result, as we shall see below, has been enormously large receipts at the great Northwestern markets (nearly the largest ever known), and unprecedented shipments from them, but smaller receipts at the Atlantic ports than in any previous winter since 1876–77.

The receipts and shipments of grain of all kinds (flour not included) at the eight reporting Northwestern markets for the three months of December, January and February for the past nine years have been, in bushels:

Grain Movement, December, January and February, for Nine Years.

Year.	Northwestern—Receipts.	Northwestern—Shipments.	Atlantic receipts.
1874	35,098,009	16,494,660	25,336,321
1875	20,242,864	9,452,738	19,524,658
1876	31,594,380	15,138,535	24,550,005
1877	28,337,187	13,404,025	24,775,817
1878	33,280,272	21,570,938	43,392 488
1879	41,426,544	19,180,008	42,270,262
1880	47,600,301	17,633,783	39,477,642
1881	43,718,372	20,959,623	36,533,780
1882	47,296,188	30,814,413	25,754,129

The receipts of the Northwestern markets this year were slightly exceeded in 1879–80, but they were 8 per cent. larger than last year, in spite of the enormous falling-off in the crop. The shipments of these markets this year were nearly one-half (47 per cent.) more than last year, when they were larger than in any previous winter save one. But in spite of this unprecedented movement of grain in the Northwest the Atlantic receipts were nearly 30 per cent. less than last year, and 40¾ per cent. less than in 1877–78, when they were largest, but when the shipments of the Northwestern markets were 9,243,000 bushels (30 per cent.) less than this year. This is one of the remarkable features of the winter's business—an unusually small proportion of the Northwestern grain has gone to the seaports. And, as we have endeavored to show heretofore, this is because an unusually large amount was needed in the interior, the short crops which lessened the surplus of the West having also increased the requirements of the states further east and south.

The supply of the East and the exports do not come wholly from the great Northwestern markets, but usually a large portion, and for some years (until lately) an increasing portion, has come directly from interior points in the West without going to, or at least without being reported at, a Northwestern market, as is the case of the large shipments (not from St. Louis or Peoria) passing over the "Joliet Cut-off" to the Michigan Central, and most of the shipments from stations west of St. Louis and Peoria passing over the Pennsylvania or the Baltimore & Ohio. These it is which for years made the receipts of Atlantic ports twice as great as the shipments of the Northwestern markets. The great change this year is manifest in the following statement of the *difference* between the Northwestern shipments and the Atlantic receipts during the three months for the nine years:

Excess of Atlantic receipts over Northwestern shipment—three winter months.

Year.	Bushels.	Year.	Bushels.
1874	8,841,661 more.	1879	23,090,254 more.
1875	10,071,920 "	1880	21,843,859 "
1876	9,411,470 "	1881	15,574,157 "
1877	11,371,792 "	1882	5,060,284 *less.*
1878	21,821,550 "		

Only three years ago the winter receipts at the seaboard were 23,000,000 bushels more than the shipments from the eight Northwestern markets; this year they are 5,000,000 less. Even last year the Atlantic receipts were 15,500,000 bushels more than the Northwestern shipments. There were enormous receipts in the Northwest (chiefly in the last two months; December receipts were smaller than usual), and there was no unusual accumulation of stocks, as there used commonly to be in the winter, waiting for cheap water rates; shipments were very much larger than ever before; but receipts at Atlantic ports show an enormous decrease. Evidently the grain has gone to interior points for home consumption to an extent not approached before.

The distribution of the receipts at the several Northwestern markets this year and last has been:

	Bushels. 1881-82.	Bushels. 1880-81.	P. c. of total. 1881-82.	P. c. of total. 1880-81.
Chicago	19,915,687	19,192,221	42.1	43.9
Milwaukee	6,011,692	5,206,419	12.7	11.9
Toledo	2,476,784	3,497,832	5.2	8.0
Detroit	1,351,623	2,203,703	2.9	5.0
Cleveland	865,131	1,121,090	1.8	2.6
St. Louis	9,762,565	6,929,796	20.7	15.8
Peoria	6,665,325	5,283,685	14.1	12.1
Duluth	247,381	291,600	0.5	0.7
Total	47,296,188	43,726,346	100.0	100.0

There are small increases at Chicago and Milwaukee and large ones at Peoria and St. Louis, and large decreases at Toledo and Detroit. The increase in receipts was wholly in January and February. In December there was a decrease of 6,400,000 bushels, which the following two months have changed into the increase of 3,570,000 bushels. In these last two months the percentage of receipts at Chicago, Milwaukee and Pennsylvania was nearly the same as last year, the changes being a large increase at St. Louis, and decreases at Toledo, Detroit and Cleveland, which together in January and February reached 16 per cent. of the whole last year, 15.5 the year before, but only 10.2 per cent. this year. The Mississippi was closed by ice most of the time until Feb. 19, last year, and has been open all this year, but there have been almost no Mississippi shipments this year—not more than in two weeks last year. The snow blockades worked against the northern lake ports last year, and the low rail rates have worked in their favor this year; but their percentage is no greater than last, while that of St. Louis and Peoria is. The peculiarity of the demand and the difference in the localities where there are surplus crops have had much effect on the distribution this year.

Turning now to the distribution of receipts among the several Atlantic ports, we find them to have been as follows, in the three months ending with February, for six successive years:

Atlantic Grain Receipts, December, January, and February, for six years:

	1876-77.	1877-78.	1878-79.
New York	7,786,962	17,872,293	17,379,704
Boston	3,377,404	3,365,793	3,724,301
Portland	464,109	935,960	645,591
Montreal	70,215	51,055	57,867
Philadelphia	4,420,200	8,116,410	7,730,850
Baltimore	7,499,944	7,790,500	9,647,400
New Orleans	1,156,983	4,260,477	3,084,549
Total	24,775,817	43,392,488	42,270,262
	1879-80.	1880-81.	1881-82.
New York	15,461,199	13,628,986	11,947,081
Boston	3,964,401	5,386,765	4,192,040
Portland	955,349	812,062	798,726
Montreal	178,440	146,298	177,005
Philadelphia	5,456,610	5,750,850	3,105,187
Baltimore	8,310, 17	8,167,050	3,390,550
New Orleans	5,151,126	2,639,069	1,553,540
Total	39,477,642	36,533,780	25,754,129

The total receipts for the three months are very little more this year than in 1876–77, which was after a very light harvest and in the dullest of dull times. This winter the receipts were nearly 30 per cent. less than last, 35 per cent. less than in 1880, 40 per cent. less than in 1879, and 4 per cent. *more* than in 1876-77. That is, the Atlantic receipts have been phenomenally small.

Compared with last year there is a decrease everywhere except Montreal, which makes no appreciable figure in winter. Of the total decrease of 10,800,000 bushels, Baltimore suffered 4,775,000, Philadelphia 2,645,000, New York 1,700,000, New Orleans 1,100,000, Boston but 600,000. If we compare this winter with that of 1876–77, when the total Atlantic receipts were about the same, we find the changes to consist of

An *increase* of 5,564,755 bushels (50 per cent.) at New York and Boston, and

A *decrease* of 5,424,407 bushels (45½ per cent.) at Philadelphia and Baltimore.

In 1876–77 Philadelphia and Baltimore received 756,000 bushels (7 per cent.) *more* grain than New York and Boston. In the winter just past New York and Boston have received 10,233,000 bushels (157 per cent.) more than Philadelphia and Baltimore—certainly a wonderful change. At New Orleans there is an increase compared with 1876–77 of 396,500 bushels (33¾ per cent.); but the amount both years was very small, and substantially all for domestic consumption, that city having exported less than 150,000 bushels during the three months this year.

The percentage of the total receipts at each port each year was:

	1876-77.	1877-78.	1878-79.	1879-80.	1880-81.	1881-82.
New York	31.4	41.2	41.1	39.2	37.3	46.4
Boston	13.6	7.8	8.9	10.0	14.8	16.6
Portland	1.9	2.2	1.5	2.4	2.2	3.1
Montreal	0.3	0.1	0.1	0.4	0.4	0.7
Philadelphia	17.9	18.7	18.3	13.8	15.7	12.0
Baltimore	30.2	20.2	22.8	21.1	22.4	13.2
New Orleans	4 7	9.8	7.3	13.1	7.2	6.0
Total	100.0	100.0	100.0	100.0	100.0	100 0

The percentages of New York, Boston and Portland are much larger this winter than in any other here reported; those of Philadelphia and Baltimore, and of

Baltimore especially, much smaller. The percentage of New Orleans is the smallest since 1877.

Comparing New York with Philadelphia and Baltimore together, we have the following percentages.

	1877.	1878.	1879.	1880.	1881.	1882.
New York	31.4	41.2	41.1	39.2	37.3	46.4
Phila. and Baltimore	48.1	38.9	41.1	34.9	38.1	25.2
The three cities	79.5	80.1	82.2	74.1	75.4	71.6

In 1876–77, Philadelphia and Baltimore together received one-half more than New York; in 1878–79, the same; in 1880–81, a little more; this year, 45 per cent. *less.*

Comparing New York and Boston together with Philadelphia and Baltimore together, we have:

	1877.	1878.	1879.	1880.	1881.	1882.
New York and Boston	45.0	49.0	50.0	49.2	52 1	65.0
Phila. and Baltimore	48.1	38.9	41.1	34.9	38.1	25.2
The four cities	93.1	87.9	91.1	84 1	90.2	90.2

Only in 1876–77 did the receipts of Philadelphia and Baltimore exceed those of New York and Boston; in 1878 and 1879 the receipts of the two last-named places were the greater by a quarter, in 1880 greater by two-fifths, last year greater by three-eighths, this year they are two and three-fifths times as great.

The decrease at the two southern cities is doubtless abnormally great; but there are solid reasons why in a time of very light exports, such as the last winter has been, there should be a much larger decrease at Baltimore than at New York. Chief of these is the fact that Baltimore probably requires not one-fourth as much for domestic consumption. On the average, for the five years ending with 1880, the apparent consumption (excess of receipts over exports) at the leading ports was:

New York	40,000,000
Boston	16,000,000
Philadelphia	14,800,000
Baltimore	9,800,000

That is, New York consumes about 50 per cent. and Boston 20 per cent. of the total (consumption including shipments not exported). Thus, if we had 240,000,000 bushels of exports, and these were distributed equally among the four ports, New York would receive 100,000,000 bushels in all, or 31¼ per cent. of the whole, and Baltimore 70,000,000 bushels, and 22 per cent. of the whole. Now if the exports fall off to 40,000,000 bushels, and are still evenly distributed, New York's receipts will be 50,000,000 bushels, or 41⅔ per cent. of the whole, while Baltimore's will be but 20,000,000, and 16⅔ per cent. of the whole. We have exported but little during the past winter, and when there are no exports Baltimore wants but little grain.

Further, when exports are light, they are likely to be taken almost exclusively by the regular steamer lines. The steamers must sail on their regular trips, and if there is not enough better-paying freight they will fill up with grain at rates which sailing vessels, carrying no other freight in either direction, probably, cannot compete with. Thus in such times the lowest ocean rates are at the places where there are most regular lines of ocean steamers. There are many more of these at New York and Boston than elsewhere. Other exports, as well as grain, are light; they have been carrying grain at low rates, and it is probable that it has not been worth their while for sailing vessels to go to Philadelphia, Baltimore and New Orleans for cargoes to the extent that they have done in previous years.

The general course of the grain movement this year bears some resemblance to that in 1876–77. The crop of 1876, like that of 1881, was poor. Then, as during the past season, the railroads carried at war prices, and though they did not carry after harvest a very large amount of grain before spring, they did carry an extraordinarily large proportion of what there was to be marketed. Then followed until after the harvest of 1877 such stagnation in this traffic as we never have had to chronicle before or since; then it brought the railroads to their lowest depths of unprofitableness; but that season was after years of business prostration, when all traffic was bad; now nearly all other traffic except that in farm products is extremely active, and the loss from any one cause has comparatively little effect, though positively it may be great in amount.

The Eads Ship Railroad.

The United States Senate Committee on Commerce, to which the Eads Ship Railway bill was referred, has authorized a report with a recommendation for its passage with sundry amendments. This brings the merits of the scheme fairly before Congress and the whole people. Whether the traffic would be sufficient to make the scheme successful if the physical difficulties are overcome we will not now discuss. It does not seem, either, that the information which is accessible is sufficient to warrant any engineer in declaring the scheme practicable or not unless he should make a special investigation of the whole subject, which would require much time and labor—more, we are inclined to believe, than has ever been given to it.

To show "the practicability of constructing and operating a ship railway" Captain Eads, or his friends, have issued a pamphlet containing "letters from leading engineers," expressing their opinions on that subject with more or less definiteness, of which the following extracts will indicate the tenor. Thus Nathaniel Barnaby, C. B., the present Chief Constructor of the British Navy, says:

"The problem of constructing a car on which a fully loaded ship can be safely transported over such a railway is soluble, and the solution is, in my opinion, fairly indicated in your (Captain Eads') plans."

Mr. John, Manager-in-Chief of the Barrow Ship-building Company, says:

"Lifting a ship of large size clear out of the water has become an every-day occurrence. The further step of lifting her to a considerable height is not a great one * * * Beyond these the conveyance of her over a railway, provided the latter is moderately level and moderately straight, is a simple matter, which is certainly not outside the reach of civil engineers."

Mr. George Fosbery Lyster, Engineer-in-Chief Liverpool Docks, says:

"If the permanent way, cradle arrangements and general details are carried out in the ingenious and substantial manner you describe, there will, in my judgment, be little or no difficulty in transporting properly constructed ships from sea to sea with entire confidence and safety."

Mr. John Fowler says:

"I have satisfied myself that there was no mechanical difficulty in carrying ships of any size, without injury to themselves, in a properly-designed car or cradle over a solidly-constructed railroad."

Mr. E. Leader Williams and Lionel B. Wells, both engineers of the Trent & Mersey Canal, testify to the success of the Anderton Lift, in which two barges and the water in which they float, weighing 250 tons, are raised and lowered by simple hydraulic apparatus through the space of 50 ft. These gentlemen also express their confidence in the practicability of a ship railway. Mr. Sidingham Duer, "who has devoted many years of his life to the study of hydraulic apparatus for lifting vessels," says:

"From long experience we may say that there is no danger or difficulty in placing a loaded ship on a carriage suitable for a railway, of transporting that ship and carriage from the water to the railway; and when this is done, I am of opinion that it will not be difficult to draw it quickly and safely across the Isthmus."

Messrs. Clark & Stanfield, "who have had a most extensive and successful experience in lifting ships," say that there will be no difficulty in raising the vessels out of the water to a height not exceeding 46 feet, and that they "apprehend no difficulty in perfecting the necessary details of the plans so as to insure the safe transportation of the largest loaded ships on the railway cars with absolute safety." Messrs. Emmerson, Murgatroyd & Co., who constructed the Anderton Lift and the hydraulic docks at Malta and at Bombay, say that they will guarantee the lifting of a fully loaded ship of 8,000 or 10,000 tons weight in 30 minutes, ready for attaching the locomotive to the car on which the ship is to be lifted and transported. Mr. William Pearce, sole proprietor of the works of John Elder & Co., expresses the opinion that a ship railway for vessels "may be constructed and worked successfully." Mr. Francis Elgar, a naval architect, thinks there would be no difficulty in raising ship nor in constructing a cradle that will carry a loaded ship over a tolerably level country without risk or injury. Don Francesco de Garay, Engineer of the Valley of Mexico, says there are no grades on his line exceeding two per cent. (105.6 ft. per mile). Mr. William Sooy Smith, the well-known American engineer, at present in charge of the Hudson River Tunnel, says:

"Ship railways on a small scale have long been in successful operation, both in this country and Europe, and any one who has seen the large ocean steamers now in use launched, cannot fail to pass by an easy transmission from the very cheap and temporary 'ways' which carry them so easily into the water, to a well-constructed railway with a suitable number of firmly-built tracks, over which these steamers with their cargoes can be hauled rapidly and safely."

Mr. Edward Hart, one of the oldest and ablest constructors in the United States Navy, expresses the opinion that "there can be no mechanical difficulty in the way of transporting loaded ships by railroad with entire safety to the vessel." Mr. H. L. Fernald, Naval Constructor of the United States Navy, is of the same opinion. Mr. Q. A. Gilmore, Lieutenant Colonel of Engineers, United States Army, says that the plan is feasible and practicable as a business enterprise if "a route of suitable alignment and grades will be found." Mr. Henry Flad thinks that the cost of a ship railroad will be one-fourth of that of a canal, that it can be made in one-third the time, that the cost of maintenance will be less, and ships can be transported on it with absolute safety. Mr. O. Chanute, the well-known engineer of the Erie Railroad, says that he "gave the subject some attention and reached conclusions almost identical" with those of Captain Eads, and that he "sees no reason why the railway should not be worked at ten miles per hour." Mr. T. C. Clarke, of the firm of Clarke, Reeves & Co., wrote that in his opinion "the ship railway is practicable to construct, and can be maintained as easily as any other railway having as large a tonnage; and that vessels of 4,000 tons can be carried across without injury to themselves or their cargoes." Gen. G. T. Beauregard, Mr. J. J. Williams, E. L. Corthell, H. D. Whitcomb, Chas. R. Suter, A. Dempster, Max E. Schmidt and E. A. Fuertes, all eminent engineers, express favorable opinions of the practicability of the scheme.

A long letter from Sir Edward J. Reed, K. C. B., formerly Chief Constructor of the British Navy, is published, in which he approves of the scheme and says:

"I am of opinion—after making some guiding calculations—that the weight of a car and cradle, of ample strength to carry a ship of 4,000 tons weight, need not exceed 500 tons; if to carry a ship of 6,000 tons it need not exceed 750 tons."

This letter is in fact the only one in which any reference is made to any of the features of construction of the car or cradle, and although the eminent author of the letter says that he has made some "guiding calculations," it is to be feared that it would hardly be safe to trust very implicitly to their direction. In making any calculations of the weight of a vehicle for transporting ships it is important, of course, to determine the loads which the wheels of such a vehicle can carry. Captain Phelps, it seems, gave the load at five tons per wheel, whereas the author of the letter says this is only about one-half of the pressure which is sometimes allowed for the wheels of our fast-running locomotives. He does not, however, give the weight of the wheels which carry these loads. Evidently there must be some relation between the weight and the carrying capacity of wheels. A 5-ft. locomotive driving-wheel and tire, which is smaller than those used in English "fast-running locomotives," weighs 2,171 lbs. If each of these wheels should carry ten tons (22,400 lbs.), the weight carried is a little more than ten times that of the wheel. Ordinary 33-in. wheels for freight cars weigh 530 lbs. each and now carry in ordinary practice 7,500 lbs. per wheel, or more than fourteen times their weight. The carrying capacity of the freight-car wheels is therefore very considerably greater than that of a 5-ft. locomotive wheel. Considering the enormous number of car wheels in use, it would be very remarkable if their weight was very much greater than was required by the service. It is very true that in some cases cars do carry heavier loads than those indicated by the weight per wheel, but the present ordinary practice indicates that 7,500 lbs. is about the limit of the load that cast-iron car wheels will safely carry. In fact, if the experience of winter before last is to be taken as an indication, the breakages which then occurred would seem to show that the loads on cast-iron wheels were then excessive. It may, of course, be that a wheel of less weight could be made with an equal carrying capacity, or of equal weight with greater strength, but if that should be done it would be an important discovery, and so much outside of ordinary experience as to make it unsafe to base any calculations thereon.

Taking the carrying capacity of ordinary car-wheels, and —for reasons which will be given hereafter—assuming the weight of a ship cradle at one-half that of the ship and its load, we would have for a 4,000-ton vessel a total load of 8,000 tons, or 13,440,000 lbs., which would require 1,792 ordinary car-wheels to carry it. A 6,000-ton ship would require the movement of a load of 9,000 tons, or 20,160,000 lbs., or 2,688 wheels. Having this data it is comparatively easy to get at the weight required for certain parts of the running gear, from the weights of these parts now in use. The following are the weights of the standard parts now recommended by the Master Car-Builders' Association:

33-inch wheel	530 lbs.
Standard journal box	74 "
" " " cover	10 "
" " " bearing	9 "
" " " " key	4 "
" pedestal	141 "
" axle (one-half)	173 "
	941 lbs.

Now, 941 × 1,792 = 1,686,272 lbs. = 752 tons; and 941 × 2,688 = 2,529,418 lbs. = 1,128 tons.

In other words, the weight of wheels, and other parts enumerated, is, alone, 50 per cent. greater than that which Sir Edward J. Reed—"after making some guiding calculations"—estimated as the whole weight of the cradle. In an ordinary box-car the weight of those parts is about one-third the weight of the whole car. If the same proportion should hold good in the construction of a ship cradle, its weight would be 2,256 tons for a 4,000-ton ship, and 3,384 for one of 6,000 tons. Bearing in mind the elaborate mechanism, hydraulic or otherwise, for equalizing the loads on the wheels, and the pressure which the ship's hull must resist, and, as Sir Edward J. Reed himself says, that "it is possible that when the ship was in motion along the railway, a considerable amount of lateral vibration might be set up," and also the tendency which large structures always have to increase in weight in a much more rapid ratio than their linear dimensions, it is thought that there is very good reason for believing that Captain Phelps' estimate that the weight of a cradle to transport a ship would be equal to that of the latter with its cargo is not nearly so wide of the mark as that of his distinguished critic.

With reference to motive power, some "guiding calculations" may also be made. It should be said first, though, that with reference to the route of the ship railroad, its projector tells us that it "has not yet been definitely determined, although my surveys have demonstrated the existence of two different ones, both of which are entirely practicable, and on one of which there are no grades greater than one foot in a hundred"—52.8 ft. per mile. As some of the engineers have stated that on lines traced and located grades of 2 per cent.—105.6 per mile— were necessary, it is apparently still uncertain what the ruling grade will be. As the line is not to have any curves, there will be no difficulty in coupling as many wheels as may be desirable, and of utilizing all the weight of the locomotives and tenders for adhesion. The latter may be assumed at one-fifth the insistent weight on the driving-wheels. The resistance at the slow speeds contemplated may be taken at 28.6 lbs. per ton (of 2,240 lbs.) on a grade of one in a hundred and 51.1 lbs. on a 2 per cent. grade. As the weight of a locomotive is five times its adhesion, for every ton weight of ship and cradle we must add for the 1 per cent. grade 28.6 × 5 = 143 lbs., and for the 2 per cent. 51.1 × 5 = 256.5 lbs., to get the total weight, including locomotive. For the 4,000-ton ship we would then have

6,256 × 143 = 894,608 lbs. = 400 tons + 6,256 = 6,656 tons
6,256 × 255.5 = 1,598,408 lbs. = 713 tons + 6,256 = 6,969

tons. For the 6,000-ton ship we would have: 9,384 × 143 = 1,341,912 lbs. = 600 tons + 9,384 = 9,984 tons: 9,384 × 255.5 = 2,397,612 lbs. = 1,070 tons + 9,384 = 10,454 tons. As the resistance on the 1 per cent. grade is 28.6 lbs. per ton, we have for the total resistance in the two cases, 6,656 × 28.6 = 190,361 lbs., and 9,984 × 28.6 = 285,542 lbs. For the two per cent. grade, 6,969 × 51.1 = 356,115 lbs.; 10,454 × 51.1 = 534,199 lbs.

As these are the resistances to be overcome, the weight of the locomotives must be five times as great or 951,805, 1,427,710, 1,780,575 and 2,670,995 lbs., that is, 475, 713, 890 and 1,335 tons (of 2,000 lbs.) in each of the cases indicated. The power required would in other words be as much as 8, 14, 18 and 27 of the heaviest consolidation engines now in use could exert. It is true that the speeds being very slow and the lines without curves the whole weight of the engine and tender can be utilized on such a line, and therefore the aggregate weight of locomotives required would not be equal to that of the number of consolidation engines named, but the figures indicate the enormous magnitude of the undertaking, and while it would be rash to say that it cannot be carried out, yet, considering the vast sums of money on which the government is asked to guarantee interest, it seems that a very thorough and searching investigation by the ablest engineers should be made into the practicability and the merits of the scheme before the Congress passes such a bill.

Record of New Railroad Construction.

This number of the *Railroad Gazette* contains information of the laying of track on new railroads as follows:

Alliance, Niles, & Ashtabula.—Track laid from Alliance, O., northeast 9 miles.

Atlantic & Pacific.—Extended from Cañon Diablo, Ariz., west to Williams, 69 miles.

Chicago, Burlington & Quincy.—Track on the *Denver Extension* is now laid 80 miles west of the Colorado line, an extension of 15 miles. Also from Denver, Col., east 3½ miles.

Ft. Worth & Denver City.—Track laid from Ft. Worth, Tex., northwest 6 miles.

Green Bay, Winona & St. Paul.—The *Stevens Point Branch* is completed from Plover, Wis., north to Stevens Point, 6 miles.

Memphis, Selma & Brunswick.—Extended from Greensboro, Ala., northwest 3½ miles. Gauge, 5 ft.

Nashville, Chattanooga & St. Louis.—The *Duck River Branch* is extended from Petersburg, Tenn., south by east to Fayetteville, 13 miles. Gauge, 3 ft.

Northern Pacific.—Extended westward to Little Rosebud, Mon., 19 miles.

St. Louis, Iron Mountain & Southern.—The *Crowley Ridge Branch* is completed to a point twenty miles south of Knobel, Ark., an extension of 10 miles.

This is a total of 154 miles of new railroad, making 609 miles thus far reported for 1882, against 254 miles reported at the corresponding time last year, 575 miles in 1880, and 141 miles in 1879.

UNITED STATES PIG-IRON PRODUCTION IN 1881 is now reported finally by Mr. James M. Swank, Secretary of the American Iron and Steel Association, who has received reports from all the blast furnaces. The output is a little less than he had estimated it, the increase over 1880 being 8 per cent. instead of 16, as estimated. The fact is that the furnaces were pushed to the utmost in 1880 when prices were highest, and the production could be increased in 1881 only by the construction of new furnaces or the improvement of old ones. It is probably fortunate that there has not been a great increase in the blast furnace capacity of the country, because we are now doubtless producing much more than the average consumption of the country.

The production in each of the last three years and in 1876 has been, in tons of 2,240 lbs.:

	1876.	1879.	1880.	1881.
Tons	1,868,961	2,741,853	3,835,191	4,144,254

The production in 1876 was the smallest for several years. In the latter part of 1879 the demand first became very great, and in that year the production was nearly 50 per cent. greater than in 1876; but from 1879 to 1880 the increase was no less than 40 per cent., and in 1880 the production was more than twice as great as in 1876. From 1880 to 1881 the increase was 309,063 tons, or 8 per cent.—as rapid a growth as would be healthy, probably, after the great expansion of the previous year. The increase since 1879 has been 1,402,401 tons, or 51 per cent.

Mr. Swank's report gives the number of tons of pig iron produced by each kind of fuel as follows:

	1879.	1880.	1881
Bituminous coal	1,284,802	1,741,254	2,025,236
Anthracite	1,136,629	1,613,974	1,548,617
Charcoal	320,422	479,963	570,301
Total	2,741,853	3,835,191	4,144,254

The rate of increase in the production of each kind has been:

	Bituminous.	Anthracite.	Charcoal.
From 1880	Inc. 16.3 p. c	Dec. 4.0 p. c.	Inc. 18.8 p. c.
From 1879	Inc. 57.6 "	Inc. 35.4 "	Inc. 78.1 "

It appears that the production of anthracite pig was less in 1881 than in 1880, which was probably partly due to the higher price of anthracite coal, but it is to be expected that the proportion of anthracite pig will decrease, because the anthracite is most distant from the part of the country where the consumption of iron increases most rapidly—that is, in the West and Southwest. The increase in bituminous pig was nearly one-sixth, but the greatest rate of increase is in charcoal pig—19¾ per cent. since 1880 and 78 per cent. since 1879. The charcoal pig was 11½ per cent. of the whole in 1879 and 13¾ per cent. in 1881.

The increase in charcoal pig has been greatest in Michigan, which now produces nearly three times as much as any other state, but there was also a large increase in Missouri, Pennsylvania and Alabama. In Missouri there was a decrease in bituminous pig nearly as great as the increase in charcoal. In total production, of course Pennsylvania leads, as always; its proportion is 47.2 per cent. of the whole in 1881, against 48.7 in 1880, and 52.4 in 1879. Then comes Ohio, with 15.5 per cent. of the production in 1881. New York follows, with a decrease in quantity and a fall in percentage from 9.2 in 1880 to 7.7 in 1881. Illinois, which held the sixth place in 1880 and the eighth in 1879, takes the third in 1881, having an increase larger in amount than any other state except Pennsylvania, yet producing but 5.4 per cent. of the whole. It has more than trebled its production since 1879. Michigan holds the fifth place, as in 1880. It was fourth in 1879. New Jersey, which was fourth in 1880, is sixth in 1881, with production nearly the same in amount. North Carolina, Colorado, California and Washington appear in 1881, for the first time in three years, among pig-iron producers—Colorado and Washington for the first time in their history.

Mr. Swank reports 25 new blast furnaces completed in 1881, and 23 others were begun, while 12 were abandoned.

The consumption of pig iron during the year, as nearly as can be ascertained, was 4,982,565 tons, which is just one-fourth more than Mr. Swank estimated that it was in 1880, in his report published last July. The home production last year was 83⅛ per cent. of the consumption.

CHICAGO SHIPMENTS EASTWARD during the week ending Feb. 25 were 47,928 tons, against 53,211 in the corresponding week of last year and 57,622 in the previous week this year. These shipments are the smallest since the last week of November, and with that exception the smallest since June 11. There were just eight weeks in 1881 when shipments were smaller; but there were only 15 in 1880 when they were larger, and 1880, it should be remembered, was the year when this traffic was most profitable. Of the shipments of the week this year, 6.1 per cent. was by the Grand Trunk, 37.3 by the Michigan Central, 17.8 by the Lake Shore, 24.7 by the Fort Wayne, 7.9 by the Panhandle, and 6.2 by the Baltimore & Ohio. The proportion of the Michigan Central is large without precedent; but it is mostly at the expense of the Lake Shore, though the Grand Trunk also suffers. The two Pennsylvania roads have nearly their old pool percentage. For three successive years the shipments of this week have been:

	1880.	1881.	1882.
Tons	42,776	53,211	47,928

For the week ending March 4 the shipments billed from Chicago by these six roads are reported by the Chicago Board of Trade to have been 35,154 tons, against 39,691 tons reported by it for the preceding week. Last week 10,233 tons of these shipments were flour, 15,104 grain and 9,715 provisions. The two Vanderbilt roads carried 51 per cent. of the flour and grain, the two Pennsylvania roads 59 per cent. of the provisions.

The prospect is for a light traffic, not only through March, but for the rest of the season, until after harvest. The announcement of the advance in rail rates next week should stimulate shipments this week, but it seems not to have done so in the last half of last week, when also it was known. The truth is, there is not much to ship. It will not be surprising if lake navigation opens by the first of April, but the 25-cent rate announced for March 13 is not high enough to keep back shipments, which, indeed, are chiefly for domestic consumption, and in large part will have to go by rail. The small amount of traffic, however, is likely to make both lake and canal rates unusually low at the opening; there is an immense tonnage to compete for the light traffic. It will probably be the best policy for the railroads not to attempt to compete with the vessels for the export grain. They can get the provisions, the flour and most of the grain intended for domestic consumption at interior points at rates which will yield some profit; but if they carry the export grain (which will be but little in any event), they will probably have to carry it at less than cost, in face of the lake and canal competition; and if they carry any grain at cost or less, they will (though they need not) carry all the through east-bound freight at similar unprofitable rates. They should recognize the fact that the lake vessels are bound to get grain to carry, if they have to take it at 1½ or 2 cents a bushel.

STATE RAILROAD MANAGEMENT is not likely to suffer for want of criticism. A Melbourne newspaper is not pleased with the railroads in the colony of Victoria, and expresses itself with something of the frankness of the American editor whose pass has not been renewed. Not to speak of graver faults, it says that the carriages are inconvenient, the stations comfortless, the clerks and porters uncivil, the fares unequal, the luggage arrangements irritating, the refreshments disgusting, and complaints unavailing. Moreover, it declares that all the gate-keepers on the line are crippled, blind, deaf or paralyzed—or all four at once. It should be borne in mind that the railroads in Victoria belong to the government and are worked by the state. Not that this accounts for their being bad, but that it may account for the very bad opinion of them expressed by a newspaper opposed to the administration. The maimed, blind and paralytic gate-keepers of which it complains evidently do not vote with its party. When that party is in power it will have much to say in praise of the Victoria railroads and its polite and accommodating clerks and porters, no doubt; but then we shall get the same complaints from the organs of the other party. Imagine the New York Central road worked by the state, with a Democratic or Republican party boss as General Manager, and his appointees as employés! We will not say what the management would be, but we venture to say that it could not be so good that the opposition newspapers would not find it horrible. By the way, the recent declaration of Prince Bismarck, that all government employés are bound to support the government candidate at the elections, must be a pretty hard dose for the 150,000 or so of the Prussian state railroad employés to swallow, the more so as a very large portion of them have very recently become state employés, being transferred with the railroads which the state has lately bought, and of course being of all kinds of politics. For that matter, however, there has been no regard to politics in forming any of the Prussian civil service corps heretofore.

General Railroad News.

MEETINGS AND ANNOUNCEMENTS.

Meetings.

Meetings will be held as follows:

St. Louis, Iron Mountain & Southern, adjourned annual meeting, in St. Louis, March 14.

Pennsylvania, annual meeting, at Musical Fund Hall, Philadelphia, March 14, at 11 a. m.

Railroad Conventions.

The *National Association of General Passenger & Ticket Agents* will hold its annual meeting in New York, at the rooms of the Railway Club, No. 46 Bond street, beginning on Tuesday, March 21, at 11 a. m. Blank credentials will be furnished new members at the meeting.

Dividends.

Dividends have been declared as follows:

Manhattan, 1½ per cent., quarterly, on the first and second-preferred stock, payable April 1. Transfer books close March 15.

Missouri Pacific, 1½ per cent., quarterly, payable April 1. Transfer books close March 20.

South Carolina, 1 per cent. upon the income bonds, out of the earnings of November and December last, payable April 15.

Dubuque & Sioux City (leased to Illinois Central), 3 per cent., semi-annual, payable April 15.

New York & Harlem, 2 per cent., payable April 1. This is from the profits of the city line, and is additional to the regular 8 per cent. dividends paid under the lease to the New York Central & Hudson River.

New York Central & Hudson River, 2 per cent., quarterly, payable April 15. Transfer books close March 15.

Western Union Telegraph, 1¼ per cent., quarterly, payable April 15. Transfer books close March 18.

ELECTIONS AND APPOINTMENTS.

Alexandria & Washington.—The United States Circuit Court has appointed Mr. G. C. Wilkins Receiver. Mr. Wilkins is Superintendent of the Northern Central and the Baltimore & Potomac road.

Atchison, Topeka & Santa Fe.—Mr. Walter W. Allen has been appointed Fuel Agent, with office in Topeka, Kan., in place of R. C. Hawley, resigned.

Baltimore & Ohio.—The following circular from President Garrett, announcing some changes already noted, is dated Baltimore, March 1.

"Mr. Nathan E. Chapman is this day appointed Master of Machinery of the Main Stem and branches, and the Trans-Ohio and Pittsburgh divisions, with headquarters at Mt. Clare, Baltimore, vice Mr. John C. Davis, resigned.

"Mr. Andrew J. Cromwell is appointed Assistant Master of Machinery of the Main Stem and branches, with headquarters at Baltimore.

"Mr. William H. Harrison is appointed Assistant Master of Machinery of the Trans-Ohio divisions, with headquarters at Newark, O.

Mr. John E. Sampsel is appointed Assistant Master of Machinery of the Pittsburgh Division, with headquarters at Connellsville, Pa."

Bell's Gap.—Mr. Charles F. Berwind has been chosen President in place of A. L. Massey. Mr. Berwind is a large coal operator in the Clearfield and Snow Shoe regions.

Carolina Central.—The board has elected John M. Robinson President, in place of D. R. Murchison, deceased, and Livingston Mimnis a director in place of Mr. Murchison. Mr. Robinson is also President of the Raleigh & Gaston and the Seaboard & Roanoke companies.

Central Iowa.—Mr. J. G. Johnston has been appointed Assistant Superintendent, with office at Marshalltown, Ia. He was connected with the road several years ago.

Central, of New Jersey.—The Chancellor of New Jersey has appointed Henry S. Little Receiver in place of Francis S. Lathrop, deceased. Mr. Little is a well-known lawyer, and was for many years Clerk of the Court of Chancery. He is President of the New York & Long Branch Company.

Central Pacific.—Mr. W. W. Prugh is appointed Assistant Superintendent of the Visalia and Tulare divisions, with office in Tulare, Cal., in place of R. B. Campbell, resigned.

Charleston & Savannah.—At the annual meeting in Charleston, S. C., last week, the following directors were chosen: W. H. Brawley, Wm. Cutting, C. G. Memminger, B. F. Newcome, H. B. Plant, W. T. Walters. The board re-elected H. B. Plant President.

Chesapeake & Ohio.—Mr. Charles Lorraine has been appointed Ticket Agent in Richmond, Va., and Acting General Baggage Agent.

Chicago & Alton.—Mr. H. G. Locke has been appointed New England Freight Agent, with headquarters in Boston.

Chicago & Grand Trunk.—This company has elected Joseph Hickson President; L. B. Seargeant, Vice-President; Charles Pearcy, Secretary and Treasurer.

Chicago, Pekin & Southwestern.—The Court has appointed Mr. Albert H. Crocker Receiver in place of S. B. Reed, resigned.

Chicago, St. Louis & New Orleans.—At the annual meeting last week the old board was re-elected. The board elected James C. Clarke President in place of Wm. H. Osborne, who declined a re-election; Stuyvesant Fish, Vice-President, in place of Mr. Clarke; Howard H. Henry, Secretary.

Chicago, Texas & Mexican.—Mr. Charles Howard has been chosen President in place of D. H. Hale. Mr. John T. McAuley succeeds Mr. Howard as Vice-President. Mr. W. H. Hale is appointed Assistant Treasurer.

Denver & Rio Grande.—Mr. A. S. Hughes has been appointed General Freight Agent in place of S. W. Eccles, who has gone to the Denver & New Orleans road.

Denver & New Orleans.—Mr. S. W. Eccles has been appointed General Superintendent. He was recently General Freight Agent of the Denver & Rio Grande.

Eastern Maine.—This company, successor to the Bucksport & Bangor, has been organized by the election of the following directors: S. D. Bailey, J. R. Bodwell, L. A. Emory, Eugene Hale, George W. Kimball, Maynard Sumner, Davis Tillson. The board elected Eugene Hale President; George W. Kimball, Vice-President; L. A. Emory, Clerk; Edward Swazey, Treasurer; L. L. Lincoln, Superintendent.

Grand Rapids & Indiana.—At the annual meeting in Grand Rapids, March 1, the following directors were chosen: H. J. Hollister, W. O. Hughart, W. R. Shelby, Grand Rapids, Mich.; G. Wait, Sturgis, Mich.; S. S. Cobb, Kalamazoo, Mich.; Pliny Hoagland, C. A. Zollinger, Fort Wayne, Ind.; J. N. McCullough, Thomas D. Messler, Wm. Thaw, Pittsburgh, Pa.; John P. Green, George B. Roberts, Philadelphia; Robert B. Potter, New York. The board re-elected W. O. Hughart President and General Manager; W. R. Shelby, Vice-President, Assistant Manager and Treasurer; J. H. P. Hughart, Secretary and Paymaster; F. A. Gorham, Auditor; H. B. Leet, General Freight and Passenger Agent; P. S. O'Rourke, Superintendent of the Southern Division; J. M. Metheany, Superintendent of the Northern Division.

Housatonic.—At the annual meeting in Bridgeport, Conn., Feb. 24, the following directors were chosen: Charles K. Averill, Wm. H. Barnum, Wm. D. Bishop, David S. Draper, Edward Leavitt, A. B. Mygatt, Horace Nichols, John B. Peck, Samuel Willetts. The board re-elected Wm. H. Barnum President; David S. Draper, Vice-President; C. K. Averill, Secretary and Treasurer.

Lake Erie & Western.—Mr. J. H. Cheney has been chosen First Vice-President in place of D. P. Eels. Mr. E. H. R. Lyman succeeds Mr. Cheney as Second Vice-President.

Maine Shore Line.—This company has been organized by the election of the following directors: S. N. Campbell, L. A. A. Emory, J. N. Greene, S. D. Leavitt, James E. Lynott, G. E. Painter, James R. Talbot. The board elected J. N. Greene President; S. N. Campbell, Clerk.

Missouri Pacific.—At the annual meeting in St. Louis, March 7, the following directors were chosen: R. S. Hayes, St. Louis; F. L. Ames, South Easton, Mass.; S. H. H. Clark, Omaha, Neb.; Wm. F. Buckley, Sidney Dillon, Thomas T. Eckert, George J. Forrest, George Gould, Jay Gould, A. L. Hopkins, H. G. Marquand, Russell Sage, Samuel Sloan, New York.

Natchez, Jackson & Columbus.—Col. J. H. Fitzpatrick, Secretary and Superintendent, has, at his own request, been relieved of the duties of Superintendent, and assumes instead those of General Freight and Passenger Agent.

Mr. Belton Mickle has been appointed Superintendent. He was recently Chief Engineer of the Selma & Greensboro road.

New York & New England.—Mr. O. M. Shepard, Master of Transportation, is Acting Superintendent of the Western and Springfield divisions, in place of J. C. Rawn, resigned.

Mr. W. W. Currier is appointed Train-Master of the Western Division, in place of Mr. Rogers, resigned.

New York, Pennsylvania & Ohio.—At the meeting held in London, March 3, the following voting trustees were chosen, to hold and vote the stock: By the first-mortage bondholders, Sir George Balfour, Henry C. Raikes, Rev. J. Lockington Bates; by the second-mortgage bondholders, Mr. Geo. C. Lewis. These are the old trustees. The party who proposed to make Wm. H. Vanderbilt and Franklin B. Gowen trustees were voted down by a large majority.

Northern Pacific.—Mr. S. G. Fulton has been appointed Division Freight Agent of the Dakota Division, with office in Fargo, D. T. The division includes all lines in Dakota east of the Missouri River. Mr. Peter B. Groat has been appointed General Immigration Agent, with office in St. Paul, Minn. Mr. Groat has had much experience in passenger business, and was at one time General Passenger Agent of the Kansas Pacific.

Philadelphia, Marlton & Medford. — This company has elected Charles A. Freeman President; D. M. Zimmerman, Secretary and Treasurer. The road is leased to the Camden & Atlantic Company.

Rio Grande & Pecos Valley.—The directors of this new company are: H. J. Clifford, H. J. Coke, L. Howell, M. A. Shaffenberg, J. W. Throckmorton, A. W. Wilcox, of Texas; J. B. Chaffee, Alexander C. Hunt, of Colorado; W. W. Waddington, New York.

Rumford Falls & Buckfield.—At the annual meeting in Canton, Me., March 1, the following directors were chosen: S. C. Andrews, R. C. Bradford, Otis Hayford, N. L. Marshall, Israel Washburn, Jr. The board re-elected Israel Washburn, Jr., President; Sullivan C. Andrews, Vice-President and Treasurer; George D. Bisbee, Clerk; Otis Hayford, Superintendent; Oren Spaulding, Assistant Superintendent; R. C. Bradford, General Freight and Ticket Agent.

St. Louis, Iron Mountain & Southern.—Mr. Jay Gould is now President in place of Henry G. Marquand. Mr. A. H. Calef has been chosen Treasurer in place of D. W. McWilliams, who has gone to the Manhattan Company.

Texas-Mexican.—Mr. Wm. J. Palmer has been chosen President, in place of Charles S. Hinchman, who continues with the company as Vice-President.

Union Pacific.—At the annual meeting in New York, March 8, the following directors were chosen: John Sharp, Salt Lake, Utah; S. H. H. Clark, Omaha, Neb.; Grenville M. Dodge, Council Bluffs, Ia.; Wm. L. Scott, Erie, Pa.; Frederick L. Ames, Elisha Atkins, Ezra H. Baker, F. Gordon Dexter, Boston; Sidney Dillon, David Dows, T. T. Eckert, Jay Gould, Solon Humphreys, Russell Sage, Augustus Schell, New York. There is no change from last year.

United New Jersey.—The New Jersey Legislature in joint convention has re-elected Charles A. Butts, of Burlington, State Director in this company.

Wabash, St. Louis & Pacific.—Mr. J. B. Barnes has been appointed Master Mechanic of the Eastern Division, with office at Ft. Wayne, Ind., in place of Chauncey R. Morris, resigned.

West Jersey.—At the annual meeting in Camden, N. J., March 7, the following directors were chosen; J. W. Dubarry, Thomas H. Dudley, Charles E. Elmer, Strickland Kneass, Coleman F. Leaming, Lewis Mulford, John M. Moore, George B. Roberts, N. Parker Shortridge, Edmund Smith, Thomas H. Whitney, George Wood, Thomas Jones Yorke.

PERSONAL.

—Mr. E. Comboul has resigned his position as Chief Engineer of the New York, Texas & Mexican road.

—Mr. J. C. Rawn has resigned his position as Superintendent of the Western Division and Springfield Branch of the New York & New England road.

—Mr. Isaiah Hoyt is probably the oldest road-master in the country, having held that position on the Boston & Providence road since 1833. The company has just named a new locomotive after its veteran officer.

—Mr. Benjamin Dow, who died at the Palmer House, Chicago, Feb. 27, aged 53 years, was widely known and liked among railroad men. For some years he had represented the Wakefield Rattan Company, of Boston.

—Mr. Chauncey R. Morris has resigned his position as Master Mechanic of the Eastern Division of the Wabash, St. Louis & Pacific road, and will return to Bridgeport, Conn., his native place, where he expects to go into business.

—Miss Kate Shelly, the young girl who saved a Chicago & Northwestern express train from wreck by a wash-out one night last summer, at the cost of considerable suffering and the risk of her own life, has been voted a gold medal by the Iowa Legislature.

—Mr. E. M. Leuffer has resigned his position as Chief Engineer of the Boston, Hoosac Tunnel & Western road, to take charge of a division of an important railroad project in Pennsylvania. His address for the present is at No. 196 Race street, Philadelphia.

—It is reported that Mr. John C. Gault, late General Manager and now General Traffic Manager of the Wabash, St. Louis & Pacific, has been offered the position of General Superintendent of the Chicago, Milwaukee & St. Paul. Mr. Gault was Assistant General Manager of the St. Paul road before he went to the Wabash.

—Judge Francis S. Lathrop, Receiver of the Central Railroad of New Jersey, and President of the company, died at his residence in Madison, N. J., March 3, of an affection of the heart. Though somewhat sudden at the last, his death was not altogether unexpected, as he had been suffering for some months.

Judge Lathrop was born in West Springfield, Mass., in November, 1806, his father, Dwight Lathrop, being a well-to-do merchant of that place. He received a common-school education, and after spending three years as a clerk in his father's store, removed to New York, where he obtained a position in a dry goods store in that city. When he had attained his majority he entered into partnership with C. L. Lusk, in the retail dry goods business. Changes were subsequently made, and in 1852 he relinquished the business and accepted the position of President of the Union Mutual Fire & Marine Insurance Company, which he held for more than 25 years. Mr. Lathrop was made President of the Board of Marine Underwriters on May 17, 1871, and held the office until September 20, 1877, when he resigned to devote himself to his duties as Receiver of the Central Railroad of New Jersey. Up to the same date, from 1865, he was Treasurer of the Chamber of Commerce. From about 1850 he was a resident of New Jersey and took a deep interest in the politics of that state, being recognized as one of the ablest leaders of the Democratic party. He never held or desired any elective office (though several times mentioned as a candidate for Governor), but served the state as a member of the Riparian Board—whose establishment was largely due to him—a member of the Morris Plains Lunatic Asylum Commission and a Lay Judge of the Court of Errors and Appeals.

Judge Lathrop was for a number of years a director of the Morris & Essex Company, and was prominent in the negotiations which ended in the lease of that road to the Delaware, Lackawanna & Western. To railroad men he is chiefly known as Receiver of the Central Railroad, since 1877, and its President for somewhat over a year past. He was not, however, in any sense distinctively a railroad man. He had had no experience in practical railroad management, and his training had been that of a merchant. And so his management of the Central, which must be considered as successful, was that of a shrewd man of business, while the immediate operation of the road was left to his subordinates. His loss will be severely felt by the party which desired his continuance in the presidency after the approaching termination of the receivership.

TRAFFIC AND EARNINGS.

Grain Movement.

For the week ending Feb. 25 receipts and shipments of grain of all kinds at the eight reporting Northwestern markets and receipts at the seven Atlantic ports have been, in bushels, for the past six years:

Year.	Northwestern receipts.	Northwestern shipments.	Atlantic receipts.
1877	2,555,959	1,315,110	2,375,036
1878	2,459,460	1,953,113	3,689,356
1879	3,390,932	1,727,475	4,389,067
1880	3,943,472	2,320,154	3,926,011
1881	2,391,492	1,686,909	3,427,219
1882	1,702,425	1,814,838	1,721,113

The change that has been going on for a little time past is here most distinctly seen. The receipts of the Northwestern markets, which previously to this year had been much larger than last year or any other year, suddenly have fallen off and become smaller than before for several years, except when reduced by snow blockades. Since April, 1877—nearly five years—Northwestern receipts have been so small in but three weeks before—namely, the last week of 1877 and the first week of 1878, and the week ending Feb. 19 last year. The decrease from the week previous this year is no less than 1,500,000 bushels, or 40% per cent. The shipments of these markets for the week were about equal to the average in the corresponding week for four years previous, but were 540,000 bushels (23 per cent.) less than the week before, and the smallest since the first week of the year. Of these shipments 205,345 bushels (11.3 per cent.) went down the Mississippi. There have now been considerable Mississippi River shipments for three successive weeks, amounting to 730,492 bushels, which is about as much as for the 10 weeks previous. Last year shipments as large as this were made in a single week. The Atlantic receipts for the week were smaller than in any corresponding week since 1875, only about half as large as last year, and the smallest since the second week of January this year. These have been small all the winter, while the Northwestern receipts and shipments until now have been unusually large.

Of the Northwestern receipts for the week, Chicago had 46 per cent., St. Louis 20, Milwaukee 12.4, Peoria 11.9, Detroit 4.4, Toledo 3 and Cleveland 2.3 per cent. The total decrease being 1,500,000 bushels from the receipts of the week previous, it was felt everywhere, but most at St. Louis, where doubtless receipts were greatly reduced by floods, but the decrease was very large also at Chicago and Milwaukee, which did not suffer much from the floods.

Of the Atlantic receipts, New York had 55.7 per cent., Boston 13.8, Philadelphia 9.2, New Orleans 8.6, Baltimore 6.8, Portland 5.3 and Montreal 0.6 per cent. Portland's receipts are exceptionally large, but they are still unimportant; the New Orleans receipts are the largest of the year, but still are small. In the corresponding week of last year they were nearly three times as great. Baltimore continues to have wholly insignificant receipts, as before this year. It received six times as much in the corresponding week of last year.

The exports of these ports during the week ending Feb. 25 were 1,560,852 bushels—58.3 per cent from New York, 14.8 from Boston, 11.1 from Philadelphia, 7.2 from Baltimore, 6.1 from Portland and 2.5 per cent from New Orleans. The New Orleans exports are the largest for eleven weeks. They were all wheat, and the first wheat exports from that port, we believe, since September.

For the week ending March 1 the exports of Atlantic ports were 127,042 barrels of flour and 1,825,772 bushels of grain this year, against 114,946 barrels of flour and 2,808,277 bushels of grain in the corresponding week of last year. The exports last week were the largest for months.

For eight successive weeks, ending March 1, exports have been:

	1882.	1881.	Inc. or Dec.	P. c.
Flour, barrels	656,834	1,027,696	D. 370,862	36.1
Wheat, bush	5,282,132	9,820,512	D. 4,538,380	41.3
Corn	2,841,908	6,395,804	D. 3,553,896	55.5
Rye	69,082	370,549	D. 301,467	81.3
Other	133,501	106,210	I. 27,291	25.7
Total	11,282,376	21,317,707	D. 10,035,331	47.1

The total exports for the eight weeks are thus little more than half those of last year.

The great improvement in exports recently is shown by the following comparison of them during the four weeks ending Feb. 1 with those of the following four weeks ending March 1:

	Four weeks to— Feb. 1.	March 1.	Increase.	P.c.
Flour, bbls	380,208	276,626	103,582	37.4
Grain, bu	5,258,913	3,067,710	2,191,203	71.4
Total, bu	6,969,849	4,312,527	2,657,322	61.6

Most of the increase in grain exports has been in flour, of which 2,189,000 bushels were exported in February, against 652,700 in the four previous weeks.

For the week ending March 4 receipts and shipments at Chicago and Milwaukee were:

	Receipts 1882.	1881.	Shipments. 1882.	1881.
Chicago	697,472	1,050,841	642,614	887,616
Milwaukee	255,077	150,506	144,562	61,078
Both	952,549	1,201,347	787,174	948,694

For the week ending March 4 receipts at four Eastern ports were:

Bushels:	New York.	Boston.	Phila.	Balt.	Total.
1882	1,134,840	222,676	51,650	78,033	1,487,199
1881	1,236,765	287,105	368,300	835,139	2,727,309
P.c. of total:					
1882	76.3	15.0	3.5	5.2	100.0
1881	45.4	10.5	13.5	30.6	100.0

Thus Philadelphia and Baltimore together received but 8.7 per cent. of the whole this year, against 44.1 last.

Railroad Earnings.

Earnings for various periods are reported as follows:

Two months ending Feb. 28:	1882.	1881.	Inc. or Dec.	P. c.
B., Cedar R. & No.	$478,454	$292,260	I. $186,194	63.7
Chic. & Eastrn Ill.	274,212	242,575	I. 31,637	13.0
Chic., Mil. & St. P.	2,812,000	1,673,564	I. 1,138,436	68.0
Chic. & Northwest	3,192,240	2,205,866	I. 986,374	44.8
C., St. P., M. & O.	622,535	416,379	I. 206,156	49.5
Denver & R. G.	904,901	625,156	I. 278,745	44.8
Det., Lan. & No.	223,643	153,099	I. 70,544	46.1
Hann. & St. Jo.	292,986	277,258	I. 15,728	5.6
Lou. & Nash.	1,910,101	1,671,241	I. 292,860	18.1
Long Island	231,468	204,518	I. 26,950	13.1
Mil., Lake S. & W.	131,246	69,408	I. 61,838	89.2
Mo. Pacific lines.				
Central Branch	129,507			
Int. & Gt. No.	398,620	391,258	I. 7,362	1.9
Mo., Kan. & T.	794,836			
Mo. Pacific	1,021,719			
St. L., I. M. & S.	1,017,295	1,131,544	D. 114,249	10.1
Tex. & Pacific	566,428	546,945	I. 19,483	3.6
Northern Pacific	508,800	195,311	I. 313,489	160.8
Ohio Central	142,461	81,927	I. 60,534	73.8
St. P., Minn. & M.	813,818	413,768	I. 400,050	96.7
Wab., St. L. & P.	2,364,733	1,630,539	I. 734,194	45.0
Month of January:				
New Lon. Nor	$36,261			
Nor. & Western	168,572			
Net earnings	68,042			
Richmond & Dan.	289,628	$249,830	I. $39,798	15.9
Month of February:				
B., C. R. & No.	$225,631	$124,510	I. $101,021	80.8
Chi. & East. Ill.	124,624	117,119	I. 7,505	6.4
Chi., Mil. & St. P.	1,377,000	684,771	I. 692,229	101.0
Chi. & Northwest.	1,471,945	963,205	I. 508,740	52.8
C., St. P., M. & O.	315,037	158,594	I. 156,441	98.4
Denver & R. G.	412,987	317,682	I. 95,305	30.0
Det., Lan. & No.	115,436	75,217	I. 40,219	53.6
Hann. & St. Jo.	154,702	122,857	I. 31,845	25.9
Louisv. & Nash.	960,036	805,124	I. 154,912	19.2
Long Island	111,780	100,005	I. 11,765	11.8
Mil., L. Sh. & W.	65,953	30,331	I. 35,622	117.5
Mo. Pacific lines:				
Cen. Branch	64,433			
Int. & Gt. No.	186,688	209,814	D. 23,126	11.0
Mo., Kan. & Tex.	394,671			
Mo. Pacific	469,042			
St. L., I. M. & So	500,925	560,586	D. 59,661	10.6
Texas & Pacific	255,643	265,769	D. 10,126	3.8
Northern Pacific	269,000	78,803	I. 190,197	241.4
Ohio Central	51,607	39,619	I. 11,988	30.3
St. P., Minn. & M.	418,358	159,482	I. 258,876	162.3
Wab., St. L. & P.	1,134,768	818,922	I. 315,846	38.5
Third week in February:				
Chi. & Gd. Trunk	$35,170	$24,946	I. $10,224	40.9
N. Y. & N. Eng.	65,617	49,038	I. 16,579	34.0
Week ending Feb. 11:				
Grand Trunk	£39,687	£39,602	I. £85	0.2
Month of December:				
	1881.	1880.		
St. John & Maine.	$12,409	$9,900	I. $2,509	25.3
Net earnings	570	1,984	D. 1,414	71.4

Special Passenger Rates.

The trunk lines have notified their Western connections of the adoption of the following agreement: 1. Military tickets may be sold at 20 per cent. below the limited tariff rates. Each lot shall be included in one ticket. 2. Theatrical tickets may be sold at 20 per cent. below limited tariff rates. They shall be sold only to known professionals, and, if a ticket thus sold to a dramatic or theatrical agent is found in

the hands of a scalper, the four trunk lines shall from such time refuse to sell any more tickets at reduced rates to such agent. 3. Commissions or rebates, westbound, shall be paid only as salary to authorized ticket agents, and none shall be paid in New York City. 4. No passes shall be issued on account of military or theatrical business, nor shall any passes be used to influence competitive business or to reduce rates.

Coal Movement.

Anthracite tonnages for the two months ending Feb. 25 are reported as follows, the tonnage in each case being only that originating on the line to which it is credited :

	1882.	1881.	Inc. or Dec.	P. c.
Phila. & Reading	725,060	805,494	D. 80,434	9.9
Northern Central, Shamokin Div. and Summit Br. R. R.	167,145	153,633	I. 13,512	8.8
Sunbury, Hazleton & Wilkesbarre	1,223	676	I. 547	83 9
Central of N. J., Lehigh Div.	547,741	491,901	I. 55,840	11.3
Lehigh Valley	654,885	761,036	D. 106,151	13.9
Pennsylvania & N. Y.	24,120	5,788	I. 18,332	315.0
Del., Lacka. & Western	529,460	601,435	D. 71,975	11.9
Del. & Hudson Canal Co.	418,473	511,421	D. 92,948	18.1
Pennsylvania Coal Co	122,601	156,646	D. 34,045	21.8
State Line & Sullivan	7,449	9,460	D. 2,011	21.2
Total anthracite	3,198,157	3,497,490	D. 299,333	8.6

The tonnage of anthracite for the corresponding period for six years has been:

1882	3,198,157	1879	2,956,412
1881	3,497,490	1878	2,026,446
1880	2,921,937	1877	2,279,210

The anthracite market is extremely dull and prices are reported much below the companies' lists. A partial stoppage of production in March is almost certain. On the other hand the miners in the Schuylkill and Wyoming regions are reported to be combining to secure more regular wages.

Actual tonnage passing over the Pennsylvania & New York road for the three months of its fiscal year from Dec. 1 to Feb. 25 was:

	1882.	1881.	Inc. or Dec.	P. c.
Authracite	237,054	172,771	I. 64,283	37.4
Bituminous	99,469	114.196	D. 14,727	12 9
Total	336,523	286,967	I. 49,556	17.3

Semi-bituminous tonnages reported for the two months ending Feb. 25 are as follows:

	1882.	1881.	Inc. or Dec.	P.c
Cumberland	313,838	197,535	I. 116,303	58.7
Huntingdon & Broad Top	36,878	37,153	D. 275	0.7
East Broad Top	17,522	10,940	I. 6 582	60.4
Tyrone & Clearfield	366,597	275,549	I. 91,048	33.0
Bellefonte & Snow Shoe	24,148	8,243	I. 15,905	169.3
Total semi-bituminous	758,983	529,420	I. 229,563	43.4

Semi bituminous coals show a very remarkable increase, which is especially notable in Cumberland.

Shipments of Cumberland coal away from the region for the two months were:

	1882.	1881.	Increase.	P. c.
By Balt. & Ohio R. R.	256,408	172,982	83,426	48.2
By Bedford Div., Pa., R. R.	55,869	24,642	31,227	126.9
Total	312,277	197,624	114,653	57.9

Of the shipments this year from the mines 30,804 tons passed over the new George's Creek & Cumberland road. The Chesapeake & Ohio Canal is not yet open for business.

Actual tonnage passing over the Huntingdon & Broad Top road for the two months was as follows :

	1882.	1881.	Inc. or Dec.	P.c.
Broad Top coal	36,878	37,153	D. 275	0.7
Cumberland coal	61,360	29,568	I. 31,792	107.4
Total	98,238	66,721	I. 31,517	47.0

The Broad Top coal is mined on the line ; the Cumberland carried through for the Pennsylvania Railroad.

Bituminous tonnages reported for the two months are:

	1882.	1881.	Inc. or Dec.	P. c.
Barclay R. R. & Coal Co.	63,520	76,899	D. 13,379	17.4
Allegheny Region, Pa. R. R.	74,633	42,551	I. 32,082	74.7
Penn and Westmoreland	205,361	143,017	I. 62,344	43.7
West Penna. R. R.	52,955	56,995	D. 4,040	7.1
Southwest Pa. R. R.	4,591	7,746	D. 3,155	41.0
Pittsburgh Region, Pa. R.R.	106,476	101,437	I. 5,039	4.9
Total bituminous	507,536	428,645	I. 78,891	18.4

Bituminous shipments show some variations, but a general improvement over January. It is to be regretted that no reports are received from the extensive districts in Northern and Northwestern Pennsylvania.

Coke tonnages reported for the two months are as follows:

	1882.	1881.	Inc. or Dec.	P. c.
Bellefonte & Snow Shoe	4,778	1,395	I. 3,383	241.6
Allegheny Region, Pa. R. R.	17,198	15,902	I. 1,296	8.1
Penn and Westmoreland	45,810	27,431	I. 18,379	68.0
West Penna. R. R.	24,321	14,318	I. 10,003	71.3
Southwest Pa. R. R.	286,846	238,878	I. 47,968	20.1
Pittsburgh Region, Pa. R. R.	98,606	62,909	I. 35,697	56.7
Total coke	477,559	369,833	I. 116,726	32.3

Coke shipments continue to show a large increase. No reports are made of the river shipments from the Pittsburgh Region.

The coal tonnage of the Pennsylvania Railroad (main line and branches in Pennsylvania) for the two months was as follows:

	1882.	1881.	Increase.	P. c.
Anthracite	221,065	206,908	14,157	6.8
Semi-bituminous	491,819	347,818	144,001	41.4
Bituminous	443,916	351,739	92,177	26.2
Coke	477,559	365,848	111,711	30.5
Total	1,634,359	1,272,313	362,046	28.4

The total tonnage in January of this year was 710,471 tons; in February, 923,888 tons.

The Philadelphia *North American* says: "The Pennsylvania will create a car trust to build for the bituminous trade, and the cars will be leased to such operators as need them at $30 per year for each car, provided that the total leases are not less than 500 cars. These charges will pay the interest on the cost of the cars. There are now 5,000 cars in the region, and the new plan contemplates about 3,000 additional cars."

Ticket Commissions.

The Wabash, St. Louis & Pacific Company has given notice that it withdraws from the agreement to pay no commission to agents of other roads on sales of tickets over its line.

Western Trunk Lines Association.

At a meeting of the Western Trunk Lines Association in Chicago, March 2, it was decided, in view of the settlement of the emigrant business between the Eastern and Western lines, to stop all discrimination between steamship lines in the matter of passes. The Executive Committee was instructed to prepare a plan for handling prepaid emigrant orders on business from Europe. The next meeting of the association will be held in New York about March 23, at which time the annual meeting of the National Association of General Ticket and Passenger Agents will be held in that city.

Petroleum.

Exports in January and February for five successive years have been, in gallons:

1882.	1881.	1880.	1879.	1878.
53,768,828	46,746,156	63,683,917	36,089,898	16,174,536

The exports this year are 15 per cent. more than last year, but 14¼ per cent. less than in 1880.

The percentage of total exports from the principal ports has been:

	New York.	Philadelphia.	Baltimore.	Boston.
1882	79.2	15.5	3.9	1.4
1881	88.3	8.8	0.2	2.6
1880	80.3	13.7	5.0	1.0
1879	70.6	19.7	8.3	1.0

In 1879 0.4 per cent. of the exports were from Richmond,

Last year Baltimore lost nearly the whole of its export trade in petroleum; this year it has recovered it.

A Long Branch Pool.

The Pennsylvania, the New Jersey Southern and the Central of New Jersey companies have formed a pooling agreement, to continue for five years from April 1 next, including the freight, passenger and express business originating at New York, Brooklyn, Jersey City, Newark and Elizabeth, destined for points on the New York & Long Branch road; also similar traffic originating at points on the New York & Long Branch road, and destined for the cities above-named.

From San Francisco to New Orleans.

The first car load of freight sent from San Francisco through to New Orleans reached the latter city Feb. 28, coming over the Southern Pacific, the Texas & Pacific, the International & Great Northern, the Texas & New Orleans and Morgan's Louisiana & Texas. The car was loaded with wine, consigned by Arpad Haraszthy & Co., of San Francisco, to F. Hollander, of New Orleans.

Chicago and Milwaukee Receipts.

For the first week of March receipts have been, for four successive years:

Chicago:	1879.	1880.	1881.	1882.
Grain, bush	1,228,182	1,741,929	731,202	747,667
Flour, bbls.	81,473	44,165	66,141	113,003
Hogs, No	99,633	133,963	62,505	90,119
Milwaukee:				
Grain, bush	311,520	239,420	60,110	249,492
Flour, bbls	53,514	32,071	13,100	44,518
Hogs, No	4,718	8,070	372	7,481

The receipts last year were cut off by snow. Compared with the earlier years the grain receipts this year are very much smaller, but the flour receipts are larger. Reducing flour to grain, the receipts of the two places have been in each of the past five weeks:

Week to—	1879.	1880.	1881.	1882.
Feb. 7	2,260,594	1,542,260	2,294,795	3,237,441
" 14	2,223,210	2,164,330	1,939,901	2,670,266
" 21	2,076 013	1,809,716	1,284,932	2,217,555
" 28	1,993,205	2,051,185	2,330,899	1,574,295
March 7	2,147,143	2,324,411	1,147,896	1,706,003

The receipts last week were somewhat greater than the week before, but were very much less than in earlier weeks, and smaller than in years previous to last year.

Trunk Lines Advisory Commission.

The Trunk Lines Advisory Commission met in New York, March 6, to hear arguments on the question of differential rates to the seaboard ports. An elaborate argumeht against differences in rates was made by Mr. A. E. Orr, Chairman of the Produce Exchange Committee.

On the following day Mr. Franklin R. Edson, also of the Produce Exchange, continued the argument, his chief point being that the shorter distances to Baltimore and Philadelphia were more than counterbalanced by the heavy grades and other disadvantages of the lines to those ports, so that they had no claim to any advantage in rates over New York.

Another argument was presented by F. B. Thurber for the Board of Trade and Transportation,

The representatives of the Chamber of Commerce are still to be heard.

Next week the Commission will meet in Philadelphia, where the other side of the case will doubtless be presented.

Iowa Trunk Line Association Rates.

Mr. George H. Daniels, Commissioner of the Iowa Trunk Line Association, has just issued a new west-bound freight tariff. The rates from Toledo, Detroit, Chicago and Milwaukee to Council Bluffs remain the same as heretofore, but there is a considerable change in the rates from East St. Louis and St. Louis to Council Bluffs. The new rates from East St. Louis will be as follows: First-class, 70 cents; second, 55; third, 40; fourth, 30; special, 23; class A, 27½; class B, 22½; class C, 17½; coal, 17½; lumber, 17. The old rates from East St. Louis were: First class, 76 cents; second, 64; third, 41; fourth, 26; special, 21; class A, 30; class B, 25; class C, 15; coal, 15; lumber, 17.

The new rates from St. Louis to Council Bluffs will be: First class, 65 cents; second, 50; third, 35; fourth, 25; special, 20; class A, 25; class B, 20; class C, 15; coal, 15; lumber, 17.

The old rates from St. Louis were: First class, 71 cents; second, 59; third, 36; fourth, 21; special, 18; class A, 30; class B, 25; class C, 15; coal, 15; lumber, 13½.

Cleveland Passenger Agreement.

By an agreement which took effect March 1, and covers all passenger business from Cleveland, O., east, the New York, Pennsylvania & Ohio withdraws all its tickets from the hands of scalpers and sells them only through its regular agents. In return for this the agents of other Eastern lines agree to allow the New York, Pennsylvania & Ohio to make a differential rate of $1.50 to New York. That company agrees not only to withdraw its tickets from outside offices, but it also agrees to maintain the rate as established.

Southwestern Railway Association Rates.

A dispatch from Chicago, March 8, says: "Commissioner Midgley to-day issued a joint freight tariff on business of the Southwestern railroads east bound, to take effect March 13, from Missouri River points. These rates are to points to the Mississippi River, and are as follows: On first-class freight, 60 cents; second class, 45; third class, 30; fourth class, 20; fifth class, 19; sixth class, 20; seventh class, 20; eighth class, 15, and ninth class, 20. On wheat, 17 cents, and other cereals, 12½. From the same points to Chicago and Milwaukee: On first class, 75 cents; second, 60; third, 45; fourth, fifth and sixth, 27; seventh, 25; eighth, 19; ninth, 25½; tenth, 25; wheat, 21, and other grains, 16½. From the same ports to Toledo and Detroit the rates range from 99½ cents down to 22½, and the rate on wheat, 27."

THE SCRAP HEAP.

Passing on a Trestle.

On Friday, as the train from Brunswick was nearing Millwood, the engineer blew for brakes, which were put on promptly, and necks were craned out of the windows and eyes directed to the front to see what was the matter, when to the astonishment of all a man was seen standing in the middle of a trestle, 300 yards long and 30 high, apparently unable to move. Everybody expected to see him crushed to atoms, as the train was on down grade, which rendered the brakes incapable of checking the momentum of the engine, and the space between it and the man was rapidly growing less. The man seemed to take in the situation at a glance. He could not go to the end of the trestle before the train would be on him, and if he jumped off he would probably break his neck. He laid his plans quick, and acted at once. He laid his bundle down on the cross-ties and let himself down between the ties, holding on by his hands. As his head disappeared between the ties, the engineer blew off brakes and ran squarely over him. As soon as the monster had drawn its length over, the man raised himself up and crawled out on the track, resuming his journey as though nothing had happened.—*Albany (Ga.) News and Advertiser.*

Colors of English Express Locomotives.

A correspondent of the *English Mechanic* gives the following description of the colors used in painting engines on different railroads in Great Britain. It should be kept in mind that Russia iron is used very little, if at all, for covering boilers of English locomotives, and that the sheet-iron covering is in nearly all cases painted :

The Northeastern engines are of light green, with broad lines of darker green picked out with black and white; the frames are of a light red color. The number-plates are, as a rule, red, but I have noticed lately that some of them are painted black. London & Northwestern and Caledonia goods and mineral-engines are black, picked out with red and white. The London & Northwestern passenger-engines are same, only the black used is (I think) of a finer description, and rather more inclining to brownish tint; the number-plates are red, and name-plates polished black. The plainness of Mr. Webb's engines is somewhat relieved by the coat of arms of the company being painted on the splasher. The Midland and Great Northern are of light green color; the frames of the latter are colored not unlike those of the North Eastern engines, but darker; both the Midland and Great Northern engines are picked out with white and red; Great Eastern, black, with broad red lines; London, Brighton & South Coast, yellow, with black and crimson lines; Highland, much the same, some black picked out with white; North British, olive green, broad lines of black, edged with red, name gilt, number-plate polished brass. This color is now dying out among the North British passenger-train, and will soon be seen on the goods only. Now the color is light yellowish green (or greenish yellow), and frames and lines ruby color. Great Western, green, yellow lines, frames dark brown; London, Chatham & Dover, olive green, dark green borders, picked out with red; Southeastern, dark green, with broad lines of darker green and white lines; London & Southwestern, dark blueish green, broad black lines, white edges. Those of Lancashire & Yorkshire engines, which I have seen, were like the Great Southern & Western, or black, like London & Northwestern locos.; Manchester, Sheffield & Lincolnshire engines, green; London & Southwestern, brown; Furness, iron ore color; Maryport & Carlyle, dark green; Caledonian passenger, blue, broad black lines, picked out with white. Single engines of this railway have lion of Scotland in gilt and red on splasher of driving-wheel, coupled engines on splasher of trailing-wheel. Of course, this only applies to such classes as run main-line traffic.

A New Use for the Locomotive.

The London *Times* states that a singular adaptation of the locomotive has just been made in Russia. Information having been given to the authorities at Alexandrovo, on the Polish frontier, that the locomotive of the express leaving that station for Warsaw had been ingeniously converted into a receptacle for smuggled goods, it was carefully examined during its sojourn at the station. Though nothing was found wrong, it was deemed advisable that a custom-house official should accompany the train to its destination, where the engine furnace and boiler were emptied and deliberately taken to pieces. In the interior was discovered a secret compartment containing 123 lbs. of foreign cigars and several parcels of valuable silk. Several arrests were made, including that of the driver, but his astonishment at finding the engine to which he had so long been accustomed converted into a hardened offender against the laws was so genuine that he was released and allowed to return to his duties.

Attempt at Train Wrecking.

A dispatch from Decatur, Ill., March 7, says: "Last night a heavy hand-car was found fastened with a chain and spiked to the track upon a frog on the Illinois Midland Railroad near this city. It was placed there by a party of unknown men, who used powder to blow open the lock of a small house to get out the car. Their intention evidently was to wreck and plunder a passenger train, but the obstruction was discovered by a section foreman, who, with the assistance of his men, removed it."

Agents and Officers Bonds.

Over forty railroads in the United States have accepted the Fidelity & Casualty Co. of New York as bond for their officers and agents from whom they require security. Some of them require their entire staff to give that company's bonds. The New York Legislature has recently passed an act authorizing the acceptance of such corporation's bonds for "fidelity of persons holding positions of public and private trust."

OLD AND NEW ROADS.

Alliance, Niles & Ashtabula.—Work has been progressing on this road for some time and the grading is now nearly finished and track laid for nine miles out of Alliance. The line is from Alliance, O., northeast to Niles, a distance of 25 miles. The road is controlled by the Peunsylvania Company.

Atlantic & Pacific.—Track is now laid to Williams, Arizona, 69 miles westward from the late terminus at Cañon Diablo, 369 miles from the junction with the Atchison, Topeka & Santa Fe at Isleta, N. M., and 379 miles from Alburquerque. Cañon Diablo continues to be the operating terminus for the present.

Baltimore & Ohio.—For 16 years past, since 1866, the 23 miles of the Central Ohio road between Newark, O., and Columbus have been used in common by this company and the Pittsburgh, Cincinnati & St. Louis. For some time past a disagreement has existed, and last week the officers of the Pittsburgh, Cincinnati & St. Louis attempted to assume control, which has heretofore been vested in the officers of the other companies. The Baltimore & Ohio promptly applied

to the Court of Common Pleas at Columbus and secured a temporary injunction, leaving it in full control for the present. Proposals have been made for a settlement, and the result will probably be the building of a second parallel track on the present right of way, giving each company its own track.

It is announced that this company will certainly build the proposed new line between Baltimore and Philadelphia, about which there has been so much talk.

Bangor & Piscataquis.—The City Council of Bangor, Me., has voted to submit to a popular election the question whether the city shall waive priority of its mortgage on this road (now amounting to $925,000) and permit the company to execute a new first mortgage for $300,000. The plan is to use $40,000 of the new bonds to buy up the $200,000 second-mortgage bonds, the holders of which have consented to sell at that price, and to sell the remaining $260,000 new bonds to secure money to extend the road from its present terminus at Blanchard, Me., to Moosehead Lake.

Boston, Lowell & Concord.—The New Hampshire Supreme Court on March 7 declined to hear further arguments in the suit against the Boston & Lowell and the Concord companies, and gave its decision to the effect that the contract of Aug. 19 last between the companies was, in effect a copartnership, and, as such, contrary to law, and without authority. The Court thereupon ordered an injunction to issue, restraining the companies and their officers from working the roads under the contract, or from carrying out its provisions.

Buffalo, New York & Philadelphia.—This company has made a lease of the Genesee Valley road, now under construction from Rochester, N. Y., to Olean on the line of the old Genesee Valley Canal; the Olean, Bradford & Warren road from Olean, N. Y., to Bradford, Pa.; the Kendall & Eldred and the Bradford, Bordell & Kinzua roads, which run through the oil region about Bradford; the McKean & Buffalo from Larrabee, Pa., into the McKean County coal field, and the property of the Buffalo Coal Company, an extensive tract in McKean and Elk counties. The ownership of all these properties has been for some time in the syndicate which controls the Buffalo, New York & Philadelphia, and the new agreement simply places all the property of the syndicate under one executive management. The properties are all in good condition, and the lines in the Bradford oil region have been extremely profitable so far.

Canadian Pacific.—The bid of Langdon, Shepard & Co., of St. Paul, Minn., for the grading of nearly 500 miles of this road, from Brandon, Manitoba, to the Rocky Mountains, has been accepted.

Central, of Georgia.—The Savannah *News* of Feb. 28 says: "A very important bill for an injunction (being an amendment to the bill filed by Messrs. W. W. Gordon *et al.* against the Central Railroad & Banking Company on the 7th instant, upon which a temporary restraining order was granted by Judge Tompkins in the matter of the proposed issuance of interest certificates on the earnings of the Ocean Steamship Company) was yesterday filed in the office of the Clerk of the Superior Court.

"Gen. E. E. Alexander, in his letter published in the *Morning News* of Thursday, says:

"'That instrument (the certificate of interest) has already been executed and turned over to the Central Railroad. I scarcely think that any legal proceedings can compel the Central Railroad Company to destroy it.'

"This amended bill denies that any such instrument or certificate has been received by the Central Railroad Company, and proceeds to show the powers of the company in regard to the certificate if it has really come into their possession. The following are the essential points of the bill:

"*First*—The Central Railroad & Banking Company are only permitted to issue $7,500,000 of stock, all of which has been issued, and the law cannot be evaded by division of property in kind instead of issuing stock certificates.

"*Second*—The Central Railroad & Banking Company cannot issue either directly or indirectly any more certificates of indebtedness, because, by its charter, it is not allowed to owe at any time, by bill, bond, note, contract or otherwise, over $4,500,000, and that amount of indebtedness exists already.

"*Third*—Because by its charter the President and board of directors are only authorized to declare dividends which shall in no case exceed the amount of the net profits actually acquired by the corporation, so that the capital stock shall not be impaired.

"The bill further states that the capital stock of the Ocean Steamship Company is the sole and separate property of the Central Railroad & Banking Company, and the stockholders of the Southwestern Railroad have no interest in said interest certificate."

Charleston & Savannah.—At the recent annual meeting the report submitted shows a considerable increase in the gross receipts, but the operating expenses and repairs and construction account absorbed all of the revenue of the road, leaving a deficit of $75,000. A part of this deficit is due to the heavy losses sustained by the company by the collisions in the month of January last.

Chicago, Burlington & Quincy.—On the Denver Extension of this company's Burlington & Missouri River line track is now laid to a point 80 miles west of the line between Colorado and Nebraska, and about 50 miles west of Culbertson, leaving about 85 miles to reach Denver. On the western end grading is progressing, and track has been laid from the Denver terminus eastward 3½ miles. Grading on the gap is progressing well and the tracklayers are also busy. The company hopes to run through to Denver by June next

Chicago, St. Louis & New Orleans.—At the annual meeting in New Orleans last week, the stockholders voted to authorize the board to lease the road to the Illinois Central Company on the basis of a guarantee of 4 per cent. on the stock.

Cincinnati Northern.—This company is now running through train from Cincinnati to Dayton in connection with the Dayton Division of the Toledo, Delphos & Burlington. Its trains also make connection to Toledo and all other points on that road.

Eastern Maine.—The bondholders of the old Bucksport & Bangor Company have organized the Eastern Maine Railroad Company, and taken possession of the road, which extends from Bangor, Me., to Bucksport, 18 miles. The question of extending the line from Bucksport to Ellsworth, about 20 miles, is under consideration.

East Line & Red River.—This company has filed articles for a branch from Greenville, Tex., to Dallas.

Ft. Worth & Denver City.—The final location of this road has been completed from Ft. Worth, Tex., northwest to the crossing of the Big Wichita, a distance of 113 miles. Grading has been completed for 50 miles from Ft. Worth, track laid for six miles and work is advancing steadily.

Genesee Valley.—This unfinished road has been leased to the Buffalo, New York & Philadelphia Company, the lessee assuming all contracts for the completion of the road.

The transfer is likely to be attended by some litigation, as there are pending suits brought by George E. Fisher to enjoin the directors of this company from carrying out existing contracts and from mortgaging the road, on the alleged grounds that the contract is for an exorbitant price, that the route of the road has been changed from that specified in the charter, and that the stock issued has not been paid up as required by law.

Green Bay, Winona & St. Paul.—The Stevens Point Branch has been completed and opened for business. It is six mile long, extending from the main line at Plover, Wis., north to Stevens Point.

Hannibal & St. Joseph.—Notice is hereby given that 25 land-grant bonds were drawn on March 4 for redemption by the sinking fund in accordance with the terms of the mortgage. They will be paid on presentation to the Farmers' Loan & Trust Company in New York. The numbers drawn are: 29, 121, 137, 224, 229, 254, 319, 360, 363, 394, 438, 483, 504, 540, 548, 645, 662, 681, 744, 771, 807, 823, 837, 838 and 841. Interest will cease 60 days from date of drawing.

Lake Erie & Western.—A report comes from the West that negotiations are pending for a lease of this road to the Wabash, St. Louis & Pacific, with whose lines it competes to some extent. The report has not been confirmed.

London, South Park & Leadville.—This company has filed articles of incorporation to build a railroad from Leadville, Col., to London. The corporators are John F. Herrick, Fairplay, Col.; John F. Moulton, Buffalo, N. Y.; George R. Blanchard, Hugh J. Jewett, Herbert R. Smith, New York.

Louisville & Nashville.—The city officers of Louisville have sold 10,000 shares of the city stock at 80 to Mr. E. H. Green, who is a director and large stockholder of the company. The city still retains 9,132 shares, which will not be sold for the present, if at all.

It is said that the company has placed $10,000,000 new debenture bonds, to be secured by the deposit with the United States Trust Company, of New York, of about $28,000,000 of stocks and bonds now owned by the company.

Maine Shore Line.—The corporators of this company have completed their organization and fixed the capital stock at $1,600,000. Negotiations for the building of the road are in progress. The proposed line is from Calais, Me., westward through the shore towns to Ellsworth or Bucksport, as may be needed to complete a connection to Bangor.

Marietta & Cincinnati.—The plan of reorganization, a summary of which has been already published, has been submitted to bondholders for signature. It is also announced that bonds can be deposited with the Farmers' Loan & Trust Company in New York, certificates of the Reorganization Committee being issued in exchange.

Memphis & Charleston.—It will be remembered that sometime ago parties hostile to the East Tennessee, Virginia & Georgia Company secured a large part of the stock of this company, and at the annual meeting passed resolutions directing the board to take legal measures to set aside the lease of the road. The board has done nothing in that direction since, and it is now understood that a new arrangement has been made, which ends all opposition to the lease. The settlement is virtually a purchase by the East Tennessee Company of all the stock of the Memphis & Charleston Company, now amounting to $5,312,725, in exchange for which it is to issue new securities, the amount of which has not been definitely announced, although it is reported that the new issues will include $7,000,000 common stock, $4,387,000 preferred stock, and $4,387,000 income bonds. It is stated that the agreement has been signed and will be carried out at once.

Memphis, Selma & Brunswick.—The grading of the extension of this road from Greensboro, Ala., to Akron, the Alabama Great Southern crossing, is nearly finished. Track has been laid from Greensboro northwest 3½ miles, and the rails are going down steadily.

Morgan's Louisiana & Texas.—An agreement has been made between this company and the Houston & Texas Central on the one hand and the Southern Pacific on the other for the exchange of business between New Orleans and points in California; traffic to be carried over the Morgan roads by way of Houston.

Nashville, Chattanooga & St. Louis.—The track of the Duck River Branch is now completed to Fayetteville, Tenn., 13 miles south by east from the late terminus at Petersburg, and 48 miles from the junction with the Nashville & Decatur at Columbia. At Fayetteville it connects with the Fayetteville Branch of this road.

New York & New England.—The following order has been issued by General Manager Felton:

"The attention of officers and employés is called to the largely increased use of the telegraph by the different departments, creating a volume of business that already crowds our facilities beyond their capacity for prompt and satisfactory service. I wish to impress upon all using the telegraph the necessity of studying brevity and avoiding unnecessary repetitions, in order to relieve the telegraph of all business except such as is of the most important and urgent nature. Communications that can possibly answer their purpose by train or mail must never be sent by wire. Officers and employés should endeavor to so frame and address their telegrams that they may convey their meaning without being repeated. Heads of departments are requested to see that this order is strictly enforced."

New York, Providence & Boston.—It is said that an entirely satisfactory adjustment of the Thames bridge matter has been arranged between the railroad interests concerned and the respondents. The compromise is that the Legislature shall grant authority to this company to construct a bridge across the Thames River; but the location of the bridge and its character shall depend wholly upon the approval of a commission to be appointed by the War and Navy departments at Washington. To this proposed act and its proviso the counsel for New London and other interests in that section will make no opposition, and, in this view of the case, the Legislature will of course grant the legislation asked for.

Norfolk & Western.—This company makes the following statement for January and the four months of the fiscal year from Oct. 1 to Jan. 31:

	January.	Four months.
Gross earnings	$168,572.34	$849,795.91
Expenses	100,529.87	411,037.03
Net earnings	$68,042.47	$438,758.88

For the four months there was an increase of $58,176.80, or 7.3 per cent., in gross earnings; of $18,951.48, or 4.8 per cent., in expenses, and of $39,225.22, or 9.8 per cent., in net earnings. The local passenger rates and local freight rates (reduced June 1 and Aug. 1, 1881, respectively, in order to further the local interests of the road) being about 25 per cent. lower than in the preceding year, the increase in gross earnings for the four months is equivalent to an increase of 43 per cent. in the volume of business over that of the same four months of the previous fiscal year.

The company on Feb. 28 made the final payment of $400,000, the balance of $500,000 paid for the interest of the state of Virginia in the old Atlantic, Mississippi & Ohio road. This completes the formalities to be observed before the title was perfected, and the purchasers have received a full release and assignment of all claims of every nature which the state held against the old organization. There remains for distribution in the hands of the United States Court several hundred thousand dollars, a large portion of which will revert to the Norfolk & Western Railroad Company, which represents the great majority of the claims against this fund.

Northern Pacific.—At the Mullan tunnel in the Rocky Mountains the heading is now in about 350 ft. and work is progressing well. From the tunnel west to Lake Pend d'Oreille a considerable force is employed in grading and getting out ties and trestle timber. East of the tunnel the 80 miles between Deer Lodge and Missoula are under contract and more than half graded.

On the eastern end track is laid to the Little Rosebud, 26 miles west of Ft. Keogh, Montana. Much of the grading is completed from the end of the track westward for 50 miles, and work is progressing rapidly.

Ohio.—On March 7 the Supreme Court of Ohio gave its decision in the *quo warranto* suit, holding that the consolidation of the Cleveland, Columbus, Cincinnati & Indianapolis and the Cincinnati, Hamilton & Dayton companies, by which the Ohio Railway Company was formed, is illegal, the proceedings being fatally defective in form; the roads themselves being parallel and competing lines within the meaning of the Ohio law, which forbids the consolidation of such lines, and being connected also by a road which is leased only and not owned.

This decision is final and disposes of the Ohio Railway Company, which has no longer any legal existence and is dissolved. The roads, of course, revert to the original companies. The consolidation has never been entirely completed, the litigation having been begun immediately on the organization of the new company. The same officers, however, have been in control of both roads for some time, and some confusion may result from the necessary changes.

Ohio Central.—Notice is given that the stock of the consolidated company will be ready for delivery March 16, on the basis of 125 shares for each 100 shares of old stock.

Ontonagon & Brule River.—The question of this company's claim to a land grant is now under consideration by a committee of the United States Senate. Opponents of the grant claim that by its terms it lapsed over 10 years ago; that the lands have been so treated for years; that many persons have settled upon them and received patents from the United States. The question involves about 340,000 acres of land.

Philadelphia & Reading.—The Pennsylvania Supreme Court, on March 6, held that the deferred income bonds are a legal and valid issue. The opinion was written by Justice Paxson. He took the ground that the objection raised to the bonds upon account of their being usurious was untenable, because interest payable only upon a certain contingency on a contract to pay more than 6 per cent. is not usurious if, under certain conditions, no interest is payable at all. The objection that they are a substitute for stock he contends does not hold good, because he does not view the bonds as having any of the privileges possessed by stockholders. The company, he thinks, has a right to borrow in this particular way. The opinion closes with allusions to the welfare of the company being inseparable from the prosperity of the state, and intimates that the Court should not seek too far to find technical objections to their issue, when the President, the directors and a large number of the stockholders have deemed their issue of benefit to the corporation. The McCalmonts, it says, have not yet communicated with their clients, and it is not known what course they will take. The Reading officials have been ruled to make final answer to the suit on the same subject in the United States Court before the 20th inst. The majority opinion, which is an exceedingly long one, concludes in effect as follows: "Unless some relief can be speedily afforded by which the company's large unfunded debt can be liquidated, the interests of stockholders and to some extent of bondholders must be sacrificed. The ruin of such a property would be a public calamity, the extent of which it is difficult to measure. The deferred bond scheme was intended to meet this difficulty. We have nothing to do with its wisdom. That is a matter which concerns only those whose interests are to be affected by it. If, as the bill avers and the demurrer admits, the stock and bondholders of this company are willing to advance the sum of $10,000,000 to save this valuable property from ruin, we see no sufficient reason why they should not be permitted to do so. The decree is affirmed and the appeal dismissed at the cost of the appellants."

The dissenting opinion, concurred in by three judges, holds that the issue is not authorized by the charter; that companies should be held to strict compliance with the law, and that the proposed issue is a plan to borrow money at exorbitant interest and should not be sanctioned by a court of equity.

Pittsburgh & Atlantic.—This company has been organized to build a railroad from some point on the Pittsburgh, Chartiers & Youghiogheny road eastward to a connection with the Harrisburg & Potomac road.

Quebec, Montreal, Ottawa & Occidental.—Quebec dispatches report that the provincial government has finally agreed to accept an offer from a syndicate of New York and Canadian capitalists for the Eastern Division of this road, from Quebec to Montreal. The price is said to be $4,000,000; terms of payment are not stated.

Reading, Marietta & Hanover.—This company is a reorganization of the old Hanover Junction & Susquehanna, and purposes building the road which that company partly completed several years ago from Marietta, Pa., to Hanover.

Rio Grande & Pecos Valley.—This company has filed articles of incorporation in Texas to build a railroad beginning at Brownsville, on the Rio Grande, thence through the counties of Hidalgo, Starr, Seapoo, Seapata and Webb to Laredo, thence to the coal fields in Webb, through the counties of Kinney and Crockett to the Pecos River, a distance of 500 miles.

St. Louis, Iron Mountain & Southern.—Track on the Crowley Ridge Branch is now laid for 20 miles southward from the main line at Knobel, Ark. Regular trains run to Gainsville, 13 miles.

Seaboard & Raleigh.—Work on this road has been begun, and contracts are let for the grading from Tarboro

N. C., to Williamston, about 28 miles. Most of this section was graded several years ago. Stock subscriptions are coming in along the line from Tarboro to Raleigh.

Securities on the New York Stock Exchange.—The following securities have been placed on the lists at the New York Stock Exchange:

Chesapeake & Ohio, $2,000,000 Eastern Extension bonds.

Chicago, Milwaukee & St. Paul, $6,100,000 Chicago & Pacific, Western Division 5 per cent. bonds.

Denver & Rio Grande, $1,242,500 additional consolidated bonds.

Elizabethtown, Lexington & Big Sandy, $5,000,000 stock and $3,500,000 first-mortgage 6 per cent. bonds.

Houston, East & West Texas, $762,000 first-mortgage bonds.

Houston & Texas Central, $300,000 additional 6 per cent. general mortgage bonds.

International & Great Northern, $520,000 additional first-mortgage and $520,000 coupon bonds.

Louisville & Nashville, $7,000,000 new 6 per cent. bonds secured on the Louisville, Cincinnati & Lexington road.

Texas & Pacific, $528,000 additional Rio Grande Division bonds.

Virginia Midland, $6,000,000 common stock and $4,000,000 income 6 per cent. bonds.

Syracuse, Chenango & New York.—The Syracuse *Herald* says: "Some time in April, 1881, Justice Churchill, who was then holding a special term of the Supreme Court at Herkimer, granted an order instructing J. J. Belden, Receiver of the Chenango Valley Railroad, to advertise the property for sale. The Burt party appealed from this order to the general term at Rochester last October and received a decision in its favor. The case was then carried to the Court of Appeals, which decided last Saturday that the case was not appealable. The effect of this is to restore the force of Justice Churchill's order to sell, modified only by leave to the Burt party to make such application to the Court as it chooses. It is believed that no further action will be taken by the Burt interest."

Toledo, Cincinnati & St. Louis.—Articles of consolidation have been duly filed by this company, formed by the consolidation of the Toledo, Cincinnati & St. Louis, the Toledo, Delphos & Burlington and the Frankfort, St. Louis & Toledo. The capital stock is fixed at $15,000,000.

Utah & Northern.—The Virginia City (Montana) *Madisonian* says: "There are at present in this territory some 250 men at work on the lines of the Utah & Northern road.

"Between Twin Bridges and Glen quite a force is at work extending the Utah & Northern line through the Big Hole Cañon. From Glen, a station between Melrose and Dillon, the present line runs to Dillon in a southwesterly direction. The line now being constructed to Twin Bridges runs in a southeasterly direction. When the third side of the triangle is filled in by the line from Dillon to Twin Bridges, the regular through trains from Ogden to Butte will run *via* the latter point, along the head waters of the Jefferson, the grades being much easier.

"To the east of Twin Bridges, along the line connecting that point with Three Forks, a force of men is hard at work on the Utah & Northern grade.

"North from Three Forks to Bedford and along the east side of the Missouri River Cañon, a force of graders is now at work. On the other or west side of the cañon runs the grade of the Northern Pacific road. The distance from Bedford to be completed to Helena is but trifling."

Western Union Telegraph.—The quarterly statement for the quarter ending March 31 is as follows, March earnings estimated:

Surplus, Jan. 1	$1,035,273
Net earnings for quarter	1,550,000
Total	$2,585,273
Interest on bonds	$106,700
Sinking funds	20,000
	126,700
Surplus	$2,458,573

From this surplus it has been decided to pay a dividend of 1½ per cent. for the quarter, which will take $1,199,500, leaving a balance of $1,259,073.

The statement says: "The management having determined to open a separate account for construction and investments in new properties which go into the plant, and provide therefor from the surplus assets in the treasury, of which there are more than $8,000,000 in value of available securities, the item of construction does not appear in the quarterly statement. This arrangement will leave all the surplus earnings above fixed charges for interest and sinking funds available for dividends, which is believed to be due to the stockholders."

Wheeling Bridge.—A dispatch from Wheeling, W. Va., Feb. 28 says: "The special commission of United States engineers, consisting of Gens. Merrill, Comstock and Weitzell, to whom was referred the matter of the erection of a bridge at a point over the Ohio River by the Wheeling & Lake Erie Railroad, met in this city to-day to hear remonstrances and objections. The plans of a bridge filed some time ago with the Secretary of War provided for a channel span 50 ft. wider than the requirements of the law, which was conceded to be ample for the safe navigation of steamers. Distinguished citizens of Bridgeport, O., and Pittsburgh appeared before the commision and stated their objections to the plans of the bridge as submitted to the Secretary of War. The railroad company reconciled the objections of the Bridgeport people by conceding 50 ft. more of a channel span, and the Pittsburgh gentlemen, admitting the generous concession of the railroad company, asked that the channel span be widened 100 ft. more, making a 500 ft. span. It was admitted by all that the proposed location for the bridge was better than most bridges, and equal to any in the Western waters between Pittsburgh and Cincinnati. The Steubenville bridge, which is a curve bridge, has a channel span of only 275 ft., and other curve bridges show spans of less than 400 ft. The commission has taken the matter under advisement."

ANNUAL REPORTS.

The following is an index to the annual reports of railroad companies which have been reviewed in previous numbers of the present volume of the *Railroad Gazette:*

Chesapeake & Ohio.

This company makes the following preliminary statement for the year 1881:

	Gross earnings.	Working expenses.	Net earnings.	Extraordinary expenses.
January	$162,540	$147,643	$14,897	$11,577
February	184,389	141,429	42,960	27,300
March	228,481	153,458	75,023	74,644
April	227,343	167,209	60,134	15,561
May	252,235	157,595	94,640	36,215
June	241,135	163,786	77,349	39,232
July	225,096	168,079	57,017	29,490
August	262,858	160,192	102,666	54,893
September	247,144	149,261	97,883	32,319
October	236,396	146,322	90,074	30,239
November	235,585	141,124	94,461	35,583
December	202,141	146,646	55,495	37,606
Total	$2,705,343	$1,842,744	$862,599	$424,659

The net earnings over the extraordinary expenses were $437,940. The statement says:

"The amounts in extraordinary expenses represent expenditures made during the year on account of the renewal of the track with steel rails, and renewals of rolling stock and motive power, in excess of ordinary cost of maintenance; and these expenditures, therefore, form no part of current operating expenses, although included in the charges to that account. The work of renewing the track with steel rails, which was actively prosecuted during the year 1881, is now completed, and the extraordinary expenditures for that account have been met out of the current revenues of the road, and will not hereafter be necessary, the road being now in excellent condition for the efficient and economical handling of the increased traffic which may be expected from the recent completion of western rail connections and the extension of the eastern terminus to Newport News and from the active development of local resources now in progress along its line."

The fiscal year now ends with December, instead of with September, as heretofore.

Pennsylvania Railroad.

The report of this company for 1881 covers, as usual, the lines worked directly, which are as follows:

1. The Pennsylvania Railroad Division, including the main line from Philadelphia to Pittsburgh, 358 miles, with 812 miles of branches, 1,170 miles in all; an increase of 50 miles of branches.

2. The United Railroads of New Jersey Division, including the main line from Jersey City to Philadelphia, 89 miles, and 341 miles of branches; also the Delaware & Raritan Canal, 66 miles, in all 430 miles of railroad and 66 of canal; an increase of 28 miles.

3. The Philadelphia & Erie Division, a main line from Sunbury, Pa., to Erie, 288 miles.

A total of 1,888 miles of railroad and 66 of canals, the earnings of which were as follows:

I. PENNSYLVANIA RAILROAD DIVISION.

	1881.	1880.	Inc. or Dec.	
Gen. freights	$21,229,200.85	$20,234,046.44	I.	$995,154.41
Mis. freights	170,918.96	278,347.54	D.	107,428.58
First-class pass.	4,702,753.44	4,110,797.68	I.	591,955.76
Emigrant pass.	320,031.30	326,348.97	D.	5,517.67
Adams Express	442,486.31	351,812.06	I.	90,654.25
U. S. mails	479,086.97	371,276.56	I.	107,810.41
Mis. passengers	106,491.46	99,742.59	I.	6,748.87
Rents	195,451.50	215,285.78	D.	19,826.28
Total earn.	$27,647,008.79	$25,987,657.02	I.	$1,659,351.17
Conduct. trans.	5,705,010.31	5,319,345.75	I.	385,664.56
Motive power	4,379,351.54	4,003,728.41	I.	375,623.13
Maint. of cars	1,650,519.97	1,805,747.07	D.	155,227.10
Maint. of way	3,201,214.74	2,488,729.18	I.	712,485.56
Gen. expenses	532,372.04	433,935.37	I.	98,436.67
Total ex	$15,468,468.60	$14,051,485.78	I.	$1,416,982.82
Net earnings	$12,178,540.19	$11,936,171.84	I.	$242,368.35

II. UNITED RAILROADS OF NEW JERSEY DIVISION.

	1881.	1880.	Inc. or Dec.	
General freights	$7,152,710.78	$6,385,410.17	I.	$767,300 61
Mis. freight	176,744.45	132,338.36	I.	44,406.09
First-class pass.	4,531 868.57	4,101,582.05	I.	430 286 52
Emigrant pass.	72,038.99	60,930.85	I.	11,108.14
Adams Express	303,174.37	265,093.49	I.	38,080.88
U. S. mails	194,605.64	136,598.25	I.	58,007.39
Miscellaneous pass.	50,645.46	43,298.00	I	7,347.46
Del. & Raritan Canal	541,076.73	419,430.47	I.	121,646.16
Total earnings	$13,022,864.99	$11,544,681.74	I.	$1,478,183.25
Conducting transportation	4,704,054.12	4,090,060.71	I.	613,993.41
Motive power	2,036,265.65	1,757,604.26	I.	278,661.39
Maintenance of cars	584,103.48	526,004.72	I.	58,101.76
Maintenance of way	1,181,437.31	1,440,154.43	D.	258,717.12
General expenses	73,103.30	70,040.36		3,062.94
Canal expenses	232,314.17	331,343.53	D.	99,029.36
Total expenses	$8,811,281.03	$8,215,208.01	I.	$596,073.02
Net earnings	$4,211,583.96	$3,329,473.73	I.	$882,110.23

III. PHILADELPHIA & ERIE DIVISION.

	1881.	1880.	Inc. or Dec.	
General freights	$2,746,609.37	$3,130,835.38	D.	$384,226.01
Mis. freights	96,263.05	97,494.54	D.	1,230.19
First-class pass.	532,967.02	424,674.84	I.	108,292.18
Emigrant pass.	6,850.41	6,080.75	I.	769.66
Express	36,351.42	31,582 68	I.	4,768.74
U. S. mails	27,047.96	26,481.45	I.	566.51
Miscellaneous pass.	8,219 82	10,583.49	D.	2,363.67
Total earnings	$3,454,309.05	$3,727,733.13	D.	$273,424.08
Conducting transportation	777,999.74	$763,917.27	I.	14,082.47
Motive power	718,758.74	703,477.00	I.	15,281.74
Maintenance of cars	278,411.49	274,425.50	I.	3,985.99
Maintenance of way	654,890.33	616,534.01	I.	38,356.32
Total expenses	$2,430,060.30	$2,358,353.78	I.	$71,706.52
Net earnings	$1,024,248.75	$1,369,379.35	D.	$345,130.60

The income account is as follows:

Net earnings Pennsylvania R. R. Div., as above		$12,178,540.19
Interest from investments (in cash)		3,211,465.63
Interest on equipment, branch roads		206,691 54
Balance of interest account		49,737.88
Royalties on coal, Mineral R. R. & M. Co	$85,841.31	
Less depreciation of coal lands	26,866.93	
		58,974.38
Profits from sundry accounts		71,946.99
Premium, exchange, commissions, etc		6,426.33
Empire Line net earnings	$116,824.82	
Less payment to car trust	58,441.50	
		58,383.32
Total		$15,902,166.26
Amount brought forward		$15,902,166.26
Rentals of branch roads	$1,180,819.24	
Interest on equipment, branch r'ds	55,120.61	
Rent, Harrisburg & Lancaster	130,917.42	
Interest on bonded debt	3,349,568.00	
Interest to state on purchase of main line	188,299.00	
Interest on car trusts	428,944.43	
Interest on mortgages and ground rents	96,724.43	
State tax on dividends	293,085.90	
" " bonds	46,969.01	
		5,770,448.04
Net income, Penna. R. R. Div		$10,131,718.22
Net earnings, United N. J	$4,211,583.96	
Interest, in cash, from investments	210,836.46	
Total receipts	$4,422,420.42	
Dividends, interest, etc	4,676,893.85	
Interest on equipments	48,391.31	
Total payments	$4,725,285.16	
Net loss on N. J. lease		302,864.74
Balance remaining		$9,828,853.48
Phila. & Erie net earnings	$1,074,248.75	
Interest on equipment	165,345.12	
Extraordinary expenses	135,278.49	
Total charges	$300,623.61	
Balance, paid P. & E. Co. as rental	$723,625.14	
Total balance from operating roads		9,828,853.48
Payment to trust fund of Oct. 9, 1878, for purchase of securities	$600,000.00	
Consolidated mortgage bonds redeemed	286,480.00	
Balt. & Potomac, one-half deficiency in interest	37,177.77	
Balt. & Potomac, advances	106,154.45	
Shamokin Coal Co., "	7,000.00	
Phila. & Erie, "	175,973.53	
All. Valley, advances and guaranteed interest	400,085.00	
Sun., Hazleton & Wilkesbarre, advances	50,000.00	
Frederick and Pa. Line, advances	15,000.00	
Am. Steamship Co., "	90,000.00	
		1,767,870.75
Surplus for the year		$8,060,982.73
Dividends, 8 per cent		5,861,718.00
Balance		$2,199,264.73
Old accounts and profit on sale of securities		350,865.90
Balance of profit and loss, Dec. 31, 1880		7,793,948 71
Balance, Dec. 31, 1881		$10,344,079.34

Although the dividends paid in 1881 were $1,040,794 in excess of those paid in 1880, the amount carried to the credit of profit and loss in 1881 is only $21,950.75 less than in 1880.

It will be seen from the foregoing statements that the gross earnings upon the Pennsylvania Railroad Division show a marked increase, and notwithstanding the expenses were materially greater than in 1880, and very low rates prevailed during a greater portion of the year, there is an increase in net earnings. This must be attributed largely to the efforts of your management to stimulate the local interests of your lines, in preference to the through traffic.

On the United Railroads of New Jersey Division the large increase of gross earnings, without a corresponding increase of expenses, affords a reasonable hope that this property will cease to be an apparent expense upon your company.

The results on the Philadelphia & Erie Railroad Division have not been so favorable, from the fact that the prevailing rates which obtained on through traffic were so unprofitable as not to warrant the company in competing therefor, while the local business, owing to the character of the country through which the road passes, though showing a gratifying increase, has not yet developed to any large extent.

CONSTRUCTION.

The amounts expended and charged to capital account for construction, equipment and real estate during the year were as follows:

Construction:		
Pennsylvania R. R.		$1,839,949.96
United N. J		748,191.59
Total		$2,588,141,55
Real estate:		
Pennsylvania R. R.	$922,681.39	
United N. J	158,421.41	
		1,081,102.80
Equipment		1,836,838.84
Totals		$5,506,083.19
Less credits as follows:		
Old station at West Philadelphia, to profit and loss	$140,000.00	
Penna. R. R. real estate sold	29,668.21	
United N. J. " " "	3,976.62	
" charged to Phila. & Trenton	74,645.76	
" old equipments, etc., sold	198,162.50	
" stock received on account of Harsimus improvements	400,000.00	
		846,453.09
Net increase in property accounts		$4,659,6 0.10

The following amounts were advanced during the year for improvements and extensions of branch and auxiliary lines controlled by the Company:

Philadelphia & Long Branch	$414,281.77	
River Front	299,959.79	
Pittsburgh, Virginia & Charleston	248,213.21	
Southwest Pennsylvania	197,223.26	
Lewisburg & Tyrone	126,369.69	
Miscellaneous branch lines	141,959.92	
		$1,428,007.64
On account of these advances, there have been received in cash	$241,487.81	
And in securities	486,850.00	
		728,337.81
Leaving amount charged against these companies, in open account		$699,669.83

The large increase in freight and passenger traffic has necessitated the extensive outlays noted in the above statement, which have but inadequately provided the facilities to properly care therefor. It is believed that the expenditures have been judicious, and have tended largely to promote the economical results obtained in the management of the business of your company. Among the most important items were:

1. The Broad street station and the line extenting thereto, which will be more especially referred to hereafter.

2. Additions to the terminal improvements at Harsimus.

3. The extension of third and fourth tracks on the New Jersey Division, and straightening and widening the line through Bergen Cut.

4. At Philadelphia the extension of the Dock street freight station, and new piers at Walnut street and on the properties connected with the old Navy Yard.

5. Extension of the third and fourth tracks on the Pennsylvania Railroad Division, the necessity for which was alluded to in the last annual report.

6. The purchase of additional width of right of way at

various points on the New Jersey Division and on the Main Line; the rapid increase in the value of real estate adjacent to the line of your roads having made this advisable in order to avoid paying excessive prices in the future.

7. The purchase of real estate, principally in Philadelphia, though large purchases were made at Pittsburgh and other important points.

The expenditures for equipment represent a charge to capital account of one-half the cost of the Empire Trust and Railway Equipment Trust cars, which came into your absolute ownership during the year, the construction of 30 additional locomotives, 50 first-class passenger cars, 10 baggage cars, and the cost of an iron ferryboat, steam-tug, and 14 car-floats.

The expenditures on account of auxiliary lines were chiefly in the construction of the Philadelphia & Long Branch Railway (referred to more particularly hereafter); the Lewisburg & Tyrone Railroad; the extension of the Pittsburgh, Virginia & Charleston Railway into the coke fields, to connect with the Southwest Pennsylvania Railway; the construction of short branches of the Southwest Pennsylvania Railway; the improvement of the grades of the Western Pennsylvania Railroad, and in the construction of the River Front Railroad in Philadelphia, also more particularly referred to hereafter.

It was deemed advisable to charge to extraordinary expenses of the Philadelphia & Erie Railroad Company the cost of additional improvements upon the line of that road, amounting to $135,278.49.

The debt due to the state of Pennsylvania on account of the purchase of the Main Line was reduced during the year by the payment of $271,701, which was charged to capital account. The balance of the annual payment of $460,000 ($188,299), representing the interest upon the amount due to the state, was charged directly to income account. The balance due on account of the purchase of the Main Line is $3,561,365.78.

Under the provisions of the consolidated mortgage of the company, there was set apart on July 1 last, out of the net income, the sum required for the purchase of outstanding bonds secured by that mortgage and entitled to the security of the covenants therein, in relation to the sinking fund. Bonds to par value of $286,480 were thus purchased, and after being canceled, were delivered to the trustees under the stipulations of said mortgage; this reduction appears in the treasurer's general account. The amount of bonds so purchased to date is $925,940 at their par value.

There are now in the sinking fund for the redemption of the obligations of the various companies forming the United New Jersey Railroad & Canal Company, securities of the par value of $1,715,300. There is also a cash balance, uninvested by the trustees, of $4,546.53. Your company also holds an additional amount of $124,000 of bonds, which have been redeemed, making an aggregate investment of $1,843,846.53, for which you will in the future, in accordance with the terms of the lease, receive bonds to be issued under the general mortgage of that company.

Through the system of car trusts organized by your Company, your equipment was further increased during the year by 1,000 stock, 1,600 box, and 2,470 long gondola cars, in all 5,070 cars, of which 1,570 were placed upon your main line, 2,000 upon the Western lines, and 1,500 sub-leased to the Northern Central Railroad Company and Allegheny Valley Railroad Company.

Your board deemed it advisable to anticipate the payment of the outstanding certificates of the Empire Car Trust, amountiong to the sum of $1,073,000. The original cost of the cars covered by this trust, consisting of 2,704 box cars, 200 stock cars, 102 gondola cars, and 400 rack cars, was $1,650,000. Your equipment account was increased by one-half of that amount, being $825,000, and the difference between the amount so charged to equipment account and the amount of outstanding certificates charged to profit and loss.

The Railway Equipment Trust of Pennsylvania, representing 1,000 freight cars, at a cost of $595,000, and bearing interest at 8 per cent, per annum, was also extinguished by the payment of the outstanding certificates. As the annual rental, which included both the interest and a payment on account of the principal, had been charged off each year, the company were at the close of the trust the owners of these cars, without any representation in your capital account. It was therefore deemed expedient that your equipment account should be increased by $297,500, being one-half of the original cost of these cars, and a like credit made to profit and loss. This was the first car trust created by your company, and it will be noted that in eight years it has been entirely discharged through the annual payments thereon. During the year 1882, series A and B of the Car Trust of Pennsylvania, amounting originally to $851,923.20, will, in like manner, be extinguished.

The total cost of 20,784 cars placed upon the lines under car trusts was $11,337,000; of this amount $5,270,000 had been redeemed up to Dec. 31, 1881, leaving $6,067,000 outstanding. Payments on car trusts by the Pennsylvania Railroad Company in 1881 were $1,926,510.09, of which $192,016.20 was for interest and $1,734,493.89 on principal, and by the Pennsylvania Company $345,852.22, the sum of $99,346.11 being for interest and $246,506.11 for principal.

COMPARISONS.

The total earnings and expenses of all the lines east of Pittsburgh and Erie compare as follows:

	Gross earnings.	Expenses.	Rental and interest on equipment.	Net earnings.
1881	$44,124,182.83	$26,709,809.93	$2,762,271.76	$14,652,101.14
1880	41,260,072.49	24,624,047.57	2,728,562.13	13,906,162.79
Inc	$2,864,110.34	$2,084,762.36	$33,709.63	$745,638.35
P. c.	6.9	8.5	1.2	5.4

The percentage of expenses to gross earnings on the various lines were as follows:

	1881.	1880.	1879.	1878.
Penna. R. R., main line	54.37	51.98	51.71	52.91
Penna. R. R., including branches	55.95	54.07	54.05	53.75
United N. J., main line	67.11	67.99	64.57	.....
United N. J., including branches	68.73	70.86	67.93	65.50
United N. J., including branches and canal	67.66	71.16	66.44	66.40
Del. & Raritan Canal	42 94	79.00	46.97	55.50
Phila. & Erie	70.35	63.27	68.90	70.00

The Main Line is the 358 miles from Philadelphia to Pittsburgh. The United New Jersey Main Line is the 89 miles from New York to Philadelphia.

The gross earnings of the Main Line were $65,696.40 per mile in 1881, against $62,873.56 in 1880.

TRAFFIC.

The traffic of the various lines east of Pittsburgh was as follows:

Passengers carried.

	1881.	1880.	Inc. or Dec.	P. c.
Main Line and bran...	9,071,714	7,757,940	I. 1,319,774	17.0
United N. J...	9,132,146	8,218,532	I. 913,614	11.1
Phila. & Erie.	775,549	598,570	I. 176,979	29.5
Total	18,985,409	16,575,042	I. 2,410,367	14.5

Passenger miles.

	1881.	1880.	Inc. or Dec.	P. c.
Main Line and bran...	230,675,088	196,939,640	I. 33,735,448	17.1
United N. J...	197,306,974	171,055,377	I. 26,311,597	15.4
Phila. & Erie.	18,274,493	14,792,169	I. 3,482,324	23.5
Total	446,316,555	382,787,186	I. 63,529,369	16.6

Tons freight carried.

Main Line and bran...	18,229,365	15,364,788	I. 2,864,577	18.6
United N. J...	7,388,955	5,824,840	I. 1,564,115	26.8
Phila. & Erie.	5,277,056	4,681,463	I. 415,593	8.9
Del. & Raritan Canal	1,710,188	1,348,082	I. 362,806	26.9
Total	32,606,264	27,399,173	I. 5,207,091	19.0

Ton miles.

Main Line and bran...	2,355,438,764	2,298,317,322	I. 357,121,442	15.5
United N. J...	480,995,398	381,884,409	I. 99,109,989	25.9
Phila. & Erie.	495,395,306	559,280,067	D. 63,884,761	11.4
Del. & Raritan Canal	68,981,905	53,508,532	I. 15,473,373	28.9
Total	3,700,811,373	3,292,991,330	I. 407,820,043	12.4

The average distance traveled by each passenger in 1881 over the Main Line and branches was 25.4 miles, the same as shown in 1880.

In connection with the passenger business, it may be stated that during 1881 there were handled on the three divisions east of Pittsburgh and Erie 1,564,858 pieces of baggage as against 1,283,962 in 1880. The entire payments for lost and damaged baggage amounted to $487.15.

The number of tons of freight moved over the Main Line and branches, including 1,082,862 tons of fuel and other materials for the company's use, was 19,312,227 tons; for the previous year, 16,341,568 tons, showing an increase of 2,970,659 tons, or 18.18 per cent.; of this increase, 2,724,408 tons was in local freight. Of the 18,229,365 tons of individual freight transported over the Main Line and Branches, 2,207,529 were through, and 16,229,365 local freight. The coal shipments increased 1,195,984 tons, and the coke shipments 518,599 tons; their aggregate being 9,209,306 tons as against 7,494,723 in 1880, a gain of 1,714,583 tons. The east-bound coke tonnage from the Connellsville region shows an increase of 59,342 tons, and the west-bound an increase of 307,806 tons; the entire movement from that district amounting to 1,980,029, out of a total of 2,415,563 tons from all sources. The oil shipments show a large increase, amounting to 712,372 barrels. The grain traffic shows a large decrease.

The through freight, east bound, shows a slight increase, and the through freight west, and local freight in both directions, a marked increase.

The number and mileage of passengers on the Main Line show an increase of 17 per cent.

On the United Railroads of New Jersey there was an increase in both local and through freight in both directions of 1,564,115 tons, of which 1,189,782 was in the local traffic. The passenger traffic also shows a decided improvement, amounting to over 11 per cent. in the number carried.

On the Philadelphia & Erie Division there was a decrease of the tonnage of through freight East bound of 234,881 tons; but a large increase of local freight in both directions, aggregating 631,256 tons. There was also a marked gain in the passenger traffic.

The receipt and cost per unit of traffic were as follows, in cents:

Per passenger mile:

	Penna. R R.		United N. J.		Phila. & Erie.		All lines.	
	1881.	1880.	1881.	1880.	1881.	1880.	1881.	1880.
Receipt.	2.178	2.253	2.047	2.126	2.954	2.912	2.376	2.222
Cost	1.677	1.604	1.502	1.691	2.039	2.413	1.615	1.674
Net	0.501	0.649	0.545	0.435	0.915	0.499	0.761	0.548

Per ton mile:

Receipt.	0.799	0.880	1.487	1.672	0.554	0.560	0.857	0.918
Cost	0.437	0.474	1.064	1.204	0.415	0.358	0.517	0.540
Net	0.362	0.406	0.423	0.468	0.139	0.202	0.340	0.378

The general result shows a decrease in the rate per ton per mile of 0 061 cent; in cost, of 0.023 cent, and in net earnings of 0.038 cent. In passenger rates there was a considerable increase, both gross and net.

Eighty-eight locomotives were built at Altoona for your Main Line, and 15 for your other roads east of Pittsburgh. There were also constructed at that point 84 passenger cars, 9 baggage, postal and express cars, and 2,420 car trust cars, 649 freight cars for your Main Line, and 1,105 cars for your other lines.

At the shops on the Philadelphia & Erie Railroad, 3 locomotives and 153 freight and maintenance of way cars were built.

There were used on the Main Line and branches 11,973 tons of steel, and 788,673 ties; on the Philadelphia & Erie Railroad 2,907 tons of steel, and 181,357 ties; and on the United Railroads of New Jersey, 2,958 tons of steel, and 187,200 ties; making a total of 17,838 tons of steel, and 1,157,230 ties.

CONTROLLED LINES.

The Pennsylvania Canal earned $370,404.97. The expenses were $262,746.80; net earnings, $107,658.17; interest on bonds, $184,980; loss, $77,321.83, against $1,600.02 in 1880. This result was due to extensive damage by ice and freshets. The total tonnage was 905,095 tons, an increase of 43,297 tons. The anthracite coal tonnage increased 15,212 tons and the lumber tonnage 19,836 tons.

The operations of the controlled anthracite coal companies were as follows:

	—Tons mined.—		—Tons sold.—	
	1881.	1880.	1881.	1880.
Susquehanna Coal Co.	851,971	772,422	860,262	752,340
Summit Branch Co.	256,390	200,988	258,873	233,495
Lykens Valley Co	173,990	171,417	182,183	172,620
Mineral R. R. & Mining Co.	439,078	385,379	439,856	386,028
Total	1,721,429	1,560,206	1,741,174	1,544,483

The financial results of their operations were as follows:

	Gross earn.	Net earn.	Charges.	Net profit.
Sus. Coal Co	$2,770,958.74	$473,223.77	$100,018.38	$373,205.39
Summit Br. Co.	1,107,830.12	114,468.88	85,272.31	29,196.57
Lykens Vy. Co.	755,034.04	25,875.52	.....	25,875.52
Min. R. R. & M. Co.	1,474,035.25	226,849.43	233,589.31	93,260.12

The Susquehanna Coal Company paid from its net profits $85,472 in dividends, and the Mineral Railroad & Mining Company $10,000. The net profits of the Lykens Valley Company were used in payment of advances made by the Summit Branch Company in former years.

The average price per ton at point of sale, aggregating the results of the four coal companies for 1881, was $3.43, as against $3.34 for 1880, showing an increase of 9 cents per ton.

It will be seen from the foregoing statements that your companies mined 161,223 more tons of coal in 1881 than in 1880; and that the financial result for the year was a surplus profit of $537,413.12, after paying the interest upon their fixed liabilities, and a royalty by the Mineral Railroad and Mining Company of 53 cents per ton on coal mined, amounting to $233,589.31.

A general statement of the results from the controlled railroad lines is as follows:

	Earnings.	Net receipts.	Charges.	Profit or loss.
Northern Central	$5,443,700.00	$1,917,454.00	$1,459,417.27	P. $458,036.73
Baltimore & Potomac	966,431.85	125,508.59	272,318.33	L. 146,809.74
Cumberland Valley	622,538.47	220,429.82	217,972.56	P. 2,457.26
Allegheny Valley	2,169,786.84	904,672.99	1,690,869.30	L. 786,196.31
Pitts., Va. & Charleston	397,588.15	127,141.41	119,370.00	P. 7,771.41
Phila., Wil. & Balto	3,551,880.52	1,374,351.29	242,989.98	P. 1,131,361.36
West Jersey	991,600.50	430,846.86	261,794.53	P. 168,852.33
Camden & Phil. Ferry	161,205.73	70,751.14	10,936.00	P. 59,815.14

The regular dividends of 10 per cent. are included in charges on the Cumberland Valley road. From the net profits stated above, the Northern Central paid 6 per cent. dividends, the Philadelphia, Wilmington & Baltimore 8 per cent., and the West Jersey 4 per cent.

The Alexandria & Fredericksburg road is still operated by trustees.

The results of the operations of the American Steamship Company were not as good as in 1880, and the report says: "The financial results of the American Steamship Company since the commencement of its operations, and the necessity for large outlays for its future maintenance, have caused your board to doubt the propriety of further diverting your revenues to that purpose; and to consider the question whether all that could reasonably be asked of your company on behalf of the commercial interests of this port (Philadelphia) has not been more than performed, and whether the promotion of steamship lines should not be left to private enterprise."

LINES WEST OF PITTSBURGH.

The following statement gives the result of the lines owned or controlled by the company west of Pittsburgh, operated by the Pennsylvania Company and the Pittsburgh, Cincinnati & St. Louis Railway Company:

The total earnings of the Pennsylvania Company on lines operated by it and through organizations worked under its control were	$19,788,671.28	
Expenses for same period were	10,760,214.97	
Leaving net earnings	$9,028,456.31	
From this deduct: Rentals, interest and liabilities of all kinds chargeable thereto	6,167,704.03	
Net profit on Pennsylvania Company's lines		$2,860,752.28
The total earnings of the Pittsburgh, Cincinnati & St. Louis Railway Company on lines operated by it, and through organizations worked under its control, were	$11,270,119.66	
Expenses for same period were	8,773,252.98	
Leaving net earnings	$2,496,866.68	
From this deduct: Rentals, interest and liabilities of all kinds chargeable thereto, including the net earnings of the Columbus, Chicago & Indiana Central, paid over to the Receivers under order of Court	2,585,205.10	
Net loss on Pittsburgh, Cincinnati & St. Louis Railway Company's lines		$88 338.42
Net profit on lines west of Pittsburgh, as above		$2,772,413.86

A comparison for the two years is as follows:

Pennsylvania Co. 1881.	1880.	Inc. or Dec.	P. c.
Gross receipts $19,788,671.28	$18,260,245.20	I. $1,528,426.08	8.4
Net earn. 9,028,456.31	8,515,041.98	I. 513,414.33	6.0
Net profit. 2,860,752.28	2,384,933.19	I. 475,819.09	19.9
Pitts., Cin. & St. L.			
Gross receipts 11,270,119.66	11,243,744.56	I. 26,375.10	0.2
Net earn. 2,496,866.68	3,434,509.72	D. 937,643.04	27.3
Net loss 88,338.42	.....	.....	...
Net profit.	773,108.22	.....	..
Both companies:			
Net profit $2,772,413.86	$3,158,041.41	D. $385,627.55	12.2

It will be seen that the loss was on the Pittsburgh, Cincinnati & St. Louis or Southwestern system.

The other lines west of Pittsburgh, in connection with which the company has assumed liabilities or which it controls through the ownership of stock, but which are worked through their own individual organizations, are the St. Louis, Vandalia and Terre Haute Railroad; Indianapolis & St. Louis Railroad; St. Louis, Alton & Terre Haute Railroad; Grand Rapids & Indiana Railroad, and roads operated through its organization, and East St. Louis & Carondelet Railway; the Cleveland, Mount Vernon & Delaware Railroad having, through foreclosure of mortgage, passed out of the control of your company.

	1881.	1880.
The aggregate gross earnings of these roads were	$5,998,198.09	$6 234.183.69
Expenses	5,071,043.32	4,531,680.41
Net earnings	$927,154.77	$1.702,503 55
Deduct rental and interest	1,868,279.75	2,049,166.22
Loss	$941,124.98	$346.662.67
Of this loss your company, under existing contracts, is directly or indirectly responsible for	260,486.12	85,989.13
Which, deducted from the profit before stated	2,772,413.86	3,158,041.41
Leaves a net profit on all lines west of Pittsburgh	$2,511,927.74	$3,072,052 28
Showing a decrease for 1881 of	560.124.54	.....

The difference between this amount and the balance shown by the income accounts of the Pennsylvania Company and the Pittsburgh, Cincinnati & St. Louis Company, is due to the fact that the actual advances made during the year were $95,371.50 less than the deficits shown by the operations of the roads.

The larger part of this decrease is in the earnings of the Indianapolis & St. Louis Railroad, in which your company has a joint ownership with the Cleveland, Columbus, Cincinnati & Indianapolis Railroad Company, which is managed by the executive officers of the company.

It will be noted that in the aggregate the lines west of Pittsburgh continue to show favorable results. On the Northwestern system there was a material gain over the previous year, but on the Southwestern lines there was a marked decrease. The income of the latter lines depends largely upon the rates on through traffic, and in view of the unsettled condition of the rates upon that class of business during the last half of the year it was reasonable to anticipate a falling off in net income. It may also be noted that there were expended upon the Pittsburgh, Cincinnati & St. Louis lines for second tracks, replacing wooden bridges with

iron or stone, and other improvements of a permanent character, over $400,000, which was charged to operating expenses.

The traffic of your Western lines increased to a marked extent, the tonnage showing a gain of 3,612,061 tons, or over 16 per cent., and the number of passengers carried a gain of 1,035,582, or 10 per cent.

The Pennsylvania Company, after providing for and paying all its fixed and adjudicated obligations, was enabled to pay a dividend of 5 per cent. upon its full-paid capital stock of twenty millions of dollars, and carry to the credit of profit and loss account a surplus of $1,866,183.01. Of the issue of $3,200,000 of the Pennsylvania Company's bonds, secured by Pittsburgh, Fort Wayne & Chicago Railway stock as collateral, $385,000 have been redeemed through the operation of the sinking fund, leaving the amount outstanding $2,815,000.

The report made by the trustees of the sinking funds of the first and second mortgages of the Pittsburgh, Ft. Wayne & Chicago Railway Company shows that the regular annual contribution of $104,100 was paid to the trustees of these mortgages, and that they redeemed $40,000 of the first mortgage, and $226,500 of the second-mortgage bonds, making the total amount redeemed to Dec. 31, 1881: First-mortgage bonds, $1,236,000; second-mortgage, $1,484,500; with $328,344.59 cash uninvested.

The further sum of $85,763 was also paid into the sinking funds provided for the redemption of the existing mortgages on the other leased lines west of Pittsburgh.

For the purpose of providing a larger financial basis for the Pennsylvania Company, and to advance the interest of your company, your board deemed it advisable to transfer to the Pennsylvania Company the following:

Bonds of the Newport & Cincinnati Bridge Co., par value	$1,200,000
Stock (19,391 shares) Jefferson, Mad. & Ind., Co., valued at	1,800,000
Pennsylvania Company debenture bonds	5,000,000
Total	$8,000,000

These securities were transferred in exchange for an equal amount of the capital stock of the Pennsylvania Company, which increased the stock of that company to $20,000,000, all of which is now owned by your company.

The Pennsylvania Company deemed it advisable to avail itself of the very favorable financial condition of the country to negotiate $10,000,000 of their 4½ per cent. bonds upon satisfactory terms. The proceeds thereof are securely held to protect the interest of that company, and to provide for its future wants.

The new Union passenger station at Chicago was opened for use on April 4, 1881, and is now occupied by five of the larger railways terminating in that city. The new passenger station at Cincinnati was opened for business on Nov. 26, 1881. Both of these improvements will, no doubt, in addition to affording attractive accommodations for the public, have a beneficial influence upon the passenger traffic of your lines to and from those important cities.

The expenditures for laying additional tracks as well as readjusting the old ones, and the extension and improvement of the freight facilities at both these cities, are also nearly completed, placing your properties at these terminal points in a more satisfactory condition.

The Grand Rapids & Indiana Railroad continues to show satisfactory improvement in both its gross and net earnings, and your company has not been called upon to extend to it any financial aid during the year. The operations of the Land Department show large sales, and correspondingly large receipts; but, owing to the high price of bonds, the trustees have been able to purchase only $52,000 thereof, which were converted into income bonds, making the amount thereof issued Dec. 31, 1881, $1,095,000. The amount of assets on hand Dec. 31, 1881, applicable to the redemption and payment of the first-mortgage bonds, was:

Balance in the hands of the Trustee	$1,126,529.61
Bills and accounts receivable	751,879 60
Cash in the hands of cashier	59,748.55
Total	$1,938,157.76

The number of acres sold during the year was 46,746.46 for $645,283.13, an average of $13.80 per acre, and the entire number of acres sold to Dec. 31, 1881, after deducting canceled contracts, was 222,603.31, and the aggregate price received therefor was $4,201,618.08, or an average of $13.02 per acre.

No change has taken place in the litigation between the Columbus, Chicago & Indiana Central Railway Company, and the Pittsburgh, Cincinnati & St. Louis Railway Company, in reference to the lease of the road of the former company. The bondholders of the Columbus, Chicago & Indiana Central Railway Company have instituted steps looking to a foreclosure sale and reorganization of that company, which, should it take place, may probably lead to some settlement of this long and vexatious litigation, which it is sincerely hoped may be satisfactory to all parties.

There has been no material change since the close of the last annual report, in the status of the litigation between the St. Louis, Alton & Terre Haute Railroad Company and the Indianapolis & St. Louis Railroad Company, in which your company is indirectly interested.

The work of improving the road-bed and superstructure of your Western lines was steadily continued. Additional sections of the track of the Pittsburgh, Fort Wayne & Chicago Railway and other lines were ballasted with stone and cinder, and extensive renewals made with steel rails. The entire main line of the Pittsburgh, Ft. Wayne & Chicago Railway, the New Castle & Beaver Valley and Lawrence railroads, the Cleveland & Pittsburgh Railroad, except 21 miles, 124 miles of the Little Miami, 306 miles of the Columbus, Chicago & Indiana Central, and 75 miles of the Jeffersonville, Madison & Indianapolis railroads are now laid with steel rails. During the year there were laid on the Northwestern lines, operated directly in your interest, 6,997 tons of steel rails, and on the Southwestern lines 12,501 tons of steel and 6,305 of new and re-rolled iron rails. Continued improvements have been made in the character of the motive power and equipment.

The amount expended during the year in betterments on the lines west of Pittsburgh was	$1,895,167.85
To which add the balance due at the close of the last annual report, to wit	1,814,285.29
Total	$3,709,453.14
On account of which the Pennsylvania Co. received in 1881	1,075,627,11
Leaving a balance due in general account (including amount due by Columbus, Chicago & Indiana Central, $637,453.48), of	$2,633,826.03

The traffic of all the lines west of Pittsburgh operated directly by the Pennsylvania Company and the Pittsburgh, Cincinnati & St. Louis was as follows:

	1881.	1880.	Increase.	P. c.
Pass. carried	10,701 576	9,665,994	1,035,582	10.7
Passenger miles.	364,885,113	321,783,885	43,081,228	13.4
Tons freight carried	25,914,352	22,302,291	3,612,061	16.2
Ton miles	2,903,856,815	2,426,038,735	477,818,080	19.7

It will be seen that both classes of traffic show a very considerable increase, which was most marked in the freight. The figures indicate a greater increase of through than local business, the average travel of both passengers and freight showing an increase.

SUMMARY OF ALL LINES.

The summary for all the lines directly operated both east and west of Pittsburgh is as follows:

Traffic:	1881.	1880.	1879.
Passengers	29,686,985	26,241,036	21,863,066
Pass. miles	811,181,668	704,571,071	583,776,686
Tons freight	58,520,616	49,701,464	45,137,006
Ton miles	6,604,667,188	5,719,030,065	5,334,194,434
Earnings:			
Gross earnings	$75,182,973.77	$70,764,062.25	$60,362,575.67
Expenses, including rentals, interest, etc.	46,243,277.88	42,179,485.63	35,639,794.99
Net earnings	$28,939,695.89	$28,584,576.62	$24,722,780.68

The aggregate amount of steel rails laid in 1881 on all the lines owned, controlled or operated by the company was 54,571 tons.

The total earnings last year showed an increase over 1880 of $4,418,911.52, or 6.2 per cent.; the gross expenses increased $4,063,792.25, or 9.6 per cent., leaving a gain of only $355,119.27, or 1.2 per cent., in net earnings. It will be noted that the increase in earnings, and especially in net earnings, is much smaller than that in traffic; a result doubtless chargeable to the low rates prevailing for a large part of 1881.

GENERAL REMARKS.

Under the provisions of the trust created Oct. 9, 1878, there has been paid therein, to Dec. 31, 1881, the sum of $1,900,000, which, with the income therefrom, has been invested in securities amounting at par to $2,027,950, yielding an interest of 6.61 per cent. per annum upon the investment.

The statement of the insurance fund, also attached, shows assets on hand at the end of the year of $343,802.40, being an increase over the previous year of $107,521.31.

The construction of the Broad street passenger station in Philadelphia, with the substantial and spacious approach thereto, was so far completed as to permit it to be opened for passenger business Dec. 5, 1881. Since the early part of the present year the trains of the Philadelphia, Wilmington & Baltimore Railroad Company and its auxiliary lines have also been transferred to this station, so that it is now the central point for the daily arrival and departure of over 200 passenger trains upon your various lines entering in Philadelphia. Its appointments and construction are of the most substantial character, and it has fully met all the requirements of the service in a most satisfactory manner. This improvement cannot but have a marked influence upon the prosperity of the passenger traffic of the extensive system of lines controlled by your company to and from Philadelphia. Its cost, exclusive of alteration of tracks in the West Philadelphia yard, was, on Dec. 31, 1881:

For construction	$2,233,507.48
For real estate	2,038,761.05
Making a total of	$4,272,268.53

The above expenditure for real estate was largely increased by the purchase of more property than is at present required for the track and station; but for the reasons heretofore stated it was deemed advisable to obtain control of property that will be needed in the future. Although the outlay may seem large, yet your board are fully satisfied that it was wise to construct this work at this time, for if it had been much longer delayed the increased value of real estate, with other difficulties, would have made it almost impracticable for your company to have obtained, at any reasonable cost, what must be regarded as one of its most important improvements.

The negotiations referred to in the last report for the acquirement by your company of the control of the terminal facilities in Philadelphia of the International Navigation Company at Girard Point and Point Breeze were concluded, and a corporation formed under the name of the Girard Point Storage Company, in which your company has a controlling interest. Unfortunately, the large elevator was destroyed by fire April 28, 1881, and in consequence of the delay of the insurance companies in settling the loss, nearly six months elapsed before the work of rebuilding could be commenced, thus interfering very seriously with the export movement of grain through the port and largely increasing the cost thereof. It is expected that this elevator will be rebuilt by July 1; the additional elevator building upon the same property is now almost ready for business. Their combined capacity will be over 2,000,000 bushels.

Your board has authorized the construction of a branch road in Philadelphia, known as the River Front Railroad, extending from a point on the Philadelphia & Trenton Railroad to the Delaware River, and thence along the wharves to connect with your Delaware Extension tracks. This line will be of great value to your company, by enabling it to reach directly a large manufacturing and shipping section of the city, from which it has been heretofore excluded. It extends for its entire distance through the built-up portions of the city; there has been expended on account of construction $98,565.68 and on account of real estate, principally for freight depots and yards, $201,394.11, making a total of $299,959.79; it is completed except for about three-fourths of a mile.

The construction of the third and fourth tracks of the main line adjacent to the city of Philadelphia has so far advanced that valuable portions will be ready for use during the early part of this year. In the vicinity of Pittsburgh less progress has been made in this work, but it is hoped that during the present year enough will be brought into service to relieve your overcrowded tracks and yards at that point.

The completion of the Pittsburgh, Virginia & Charleston Railway to Brownsville has had a marked influence upon the prosperity of that company, enabling it to provide from its net receipts for all its fixed liabilities, and when, through an extension of 17 miles, now in progress, it is connected with the Southwest Pennsylvania Railway, near Uniontown, there is reason to believe that all that was claimed for it in your last report will be more than realized.

The continued activity in the coke district developed by the Southwest Pennsylvania Railway has necessitated the further extension of its branches; this railroad continues to be one of the most important local feeders to your Main Line.

Difficulties have attended the location of the revised line of the Western Pennsylvania Railroad, the importance of which was particularly referred to in the last report, but a considerable portion of the work is now under contract.

The consummation of the purchase of the Bellefonte & Snow Shoe Railroad, and its consolidation with the Bald Eagle Valley Railroad, have had a favorable influence upon the development of the semi-bituminous coal region tributary to that line, and your interest in these properties has been largely promoted thereby. A further extension of branch lines into the Clearfield and adjacent Karthaus coal regions is contemplated by your board. The large increase in this traffic and its importance to the interests of your company, fully warrant the necessary expenditure for its proper development.

Your board deemed it for the interest of your company to acquire a controlling interest in, and to assume the completion of, the North & West Branch Railway. This line extends from a connection with the Sunbury, Hazleton & Wilkesbarre Railway (controlled by your company), to the town of Wilkesbarre, a distance of about 46 miles, passing through your own and other valuable anthracite coal properties. The anthracite coal tonnage tributary to your lines, that should pass over the North & West Branch Railway, will, in all probability, make it directly profitable as an investment, in addition to its indirect advantage to your other properties.

The maintenance of the long wooden bridge of the Northern Central Railway Company crossing the Susquehanna River at Marysville, has become so expensive as to make it advisable to build a road connecting your main line with the Northern Central Railway on the east bank of that river. This will enable the traffic of that road to use the substantial iron bridge of your company but a few miles below, and will save further expenditure upon the structure referred to. The work is now in progress, and will be completed this year; its estimated cost, including bridge connections, will be about $200,000.

The Philadelphia & Long Branch Railway, extending from Whitings to the seashore, and thence northwardly along the coast to a connection with the lines of the Central Railroad of New Jersey, was completed in the past year, but not in time to accommodate the summer traffic. Following the completion of this line, negotiations were opened with the Central Railroad Company of New Jersey for the use of their leased line extending from the connection aforesaid to Perth Amboy, which resulted in a contract between the Pennsylvania Railroad Company, the Central Railroad Company of New Jersey and the New York & Long Branch Railway Company, by which your company secures the joint use of a continuous line from New York to Long Branch, and the other large seaside resorts in that vicinity, thus rendering unnecessary the construction of a competitive line. It is confidently believed that this arrangement will be productive of beneficial results to your New Jersey lines.

Your board have also entered into a contract with the Wabash, St. Louis & Pacific Railway Company, and the Central Railroad Company of New Jersey, by which your lines between Red Bank, on the Allegheny Valley Railroad, and Milton, on the Philadelphia & Erie Railroad, will be used by the companies named, for the exchange of through traffic between their respective lines. Under this arrangement the Wabash, St. Louis & Pacific Railway Company, and the Central Railroad Company of New Jersey, are to promote the construction of a road between Red Bank and Youngstown, and if they avail themselves of the privileges thus afforded to them, both the Philadelphia & Erie Railroad and the Low Grade Division of the Allegheny Valley Railroad should be benefited thereby. The contract was made in pursuance of the policy which your management deemed it wise to establish, that of permitting the use of your lines by other companies, even though their traffic might be to a large extent competitive, and in pursuance thereof the Pennsylvania Company have heretofore extended to the other trunk-line systems the use of your Western roads, and notably, in this direction, recently opened under satisfactory arrangements, such portions of their system to the New York, Lake Erie & Western Railroad Company as it desired to use for the purpose of reaching the large commercial centres of the West. It is believed that the advantages to be obtained by the commercial interests of the country and by your company from the adoption of this broad principle in the management of your railways, will more than compensate for any loss that may occur through the diversion of traffic that might be controlled by a more exclusive policy.

During the year a reorganization was effected of the company owing the railroad between Pomeroy and Delaware City, by which that portion of the line extending from Pomeroy on your Main Line to a connection with the Philadelphia, Wilmington & Baltimore Railroad, near Newark, was organized as the Pomeroy & Newark Railroad, your company owning the entire share capital thereof. That portion of the road between the Philadelphia, Wilmington & Baltimore Railroad, and Delaware City, was sold to that company, and will be operated by it.

During the past summer, surveys have been made for short branches from your Main Line into the Schuylkill Valley, at Conshohocken and Phoenixville, to reach the large iron and other manufacturing interests located at those points. The traffic to be secured thereby to your Main Line would seem to warrant their construction.

At the request of the American Union Telegraph Company, their contract with your company was annulled, and thereupon a new contract was made with the Western Union Telegraph Company, under date of Sept. 20, 1881, by which your company receives a fair compensation for the privileges accorded on its lines, and under which all former contracts with the Western Union Company have been canceled. This arrangement has settled on a satisfactory basis a number of questions at issue between the two companies, and has given a definite interpretation to the rights of both parties, in lieu of the numerous vague and conflicting agreements heretofore in existence, which were causing continued litigation.

In pursuance of the authority conferred at the last annual meeting, there were allotted to the shareholders in May, 1881, 176,051 shares of your capital stock at par, so that the share capital is now represented by 1,553,455 shares o a par value of $77,672,750. The shares of the capital stock purchased from the city of Philadelphia, that had not been distributed to the shareholders, were sold at their market value, and the proceeds applied to the general purposes of the company. It should not be forgotten by the shareholders that the premium obtained by them on this allotment, added to the cash dividends paid during the year, was equivalent to a total dividend of 12 per cent.

At the last annual meeting you were advised that your board had concluded a contract for the purchase of not less than 92,000 shares of the capital stock of the Philadelphia, Wilmington & Baltimore Railroad Company, with the option, on the part of the sellers, to deliver the whole issue thereof. Under this contract there were acquired 217,819 out of a total issue of 235,901 shares, costing your company $17,032,879.25. The funds for this payment were supplied, in part, through the allotment of the stock before alluded to, and in part through the sale of $10,000,000 of trust certificates, bearing interest at 4 per cent. per annum, for the payment of which the faith of your company is pledged; they are further secured by a collateral deposit of 200,000 shares of Philadelphia, Wilmington & Baltimore Railroad stock, at its par value of $50 per share, with the Pennsylvania Company for Insurances on Lives and Granting Annuities, as trustee. The dividends upon this stock, after providing for the interest upon the then outstanding certificates, are applied as a sinking fund to their purchase and cancellation whenever they can be obtained at a price not exceeding par. Should the revenues of the Philadel-

phia, Wilmington & Baltimore Railroad Company be as satisfactory in the future as they have been in the past, the sinking fund from this source will provide for the redemption of the loan long before its maturity, without any other contribution from your revenues, and will therefore result in giving to your company this valuable property at a nominal price compared with its present value. It was thought better to resort to this method of obtaining a portion of the moneys necessary to make this large payment, than to raise the entire amount through an increase of your capital stock, especially as your company was able to dispose of the trust certificates at a satisfactory price. From the further examination made of the condition of this property since its acquisition, your board are more than ever convinced of the wisdom of its purchase, although the price paid therefor was at the time thought to be fully equal to, if not in excess of, its value. It not only gives to your company the ownership of a continuous line between Washington and New York, and makes directly tributary to your system the valuable traffic originating in the productive section traversed by its auxiliary lines, but also secures extensive additional terminal facilities at Philadelphia and Baltimore, of such character as could not now be acquired at any reasonable cost, if at all.

Should the industrial prosperity of the country continue during the present year, the interest of your companies can only be properly protected by continued expenditure for additional facilities and improvements needed to meet increase of traffic. When it is remembered that the tonnage of your main line and branches has increased during the last eleven years over 200 per cent., and that the average increase each year over the preceding one has been over 11 per cent., the necessity for this continued outlay of capital for tracks, equipment and other property is self-evident. This increase of traffic is only secured by accepting the steady reduction in rates which seems to be demanded by the commercial interests of the country, and in order to obtain any profit from its transportation and meet the exacting requirement of the public, your properties must have the best possible facilities for its prompt and economical movement. Your attention is specially called to the statements showing the rate per ton per mile received on freight traffic and the cost of moving the same on the several divisions of your road. From these it will be noted that these rates have now reached a point where only through remarkable economies in the movement of tonnage, and the maintenance of your properties at the highest standard of efficiency, can any profit be realized therefrom. Certainly no grave cause of complaint can exist on the part of the commercial interests served by your road, when the average rate received for the transportation of freight on your main line and branches for the year was less than eight mills per ton per mile.

The harmonious relations existing between the Trunk Lines during the year 1880, which secured such satisfactory results to the commercial interests of the country, as well as to the railways, were unfortunately disturbed during the last seven months of the year 1881, by causes beyond the control of your management. This led to a more severe and continued reduction of rates than had ever before occurred. Owing to the great volume of local and through traffic pressing upon your lines, your company was able to obtain rates, which, while in advance of those charged by competitive lines, left but a small margin of profit. The effects of the reduction were more marked upon your Southwestern roads than upon any other portion of your system, by reason of a larger proportion of their business being composed of through traffic. It is now hoped that some satisfactory understanding will be reached that will prevent a recurrence of these differences; the efforts of your management have been steadily directed toward that end.

CHANGES IN ORGANIZATION.

The hope expressed in your last report that relief from official cares would restore the health and vigor of your former President, Mr. Thomas A. Scott, was unhappily not realized. His unwearying devotion to the interests in his charge had so shattered his health that, on May 21, 1881, less than a year after his resignation, he died, universally lamented and regretted. Suitable action was taken by the board, and entered on the minutes as a brief tribute to the memory of one whose life was so inseparably identified with the interests of your company.

Your company also lost during the year by resignation, and but a short time before his death, the services of Mr. Thomas T. Firth, long and honorably associated with your road as its Treasurer, and in other capacities. Mr. Joseph Lesley, who had been in your service since Dec. 5, 1860, and your Secretary since May 3, 1869, having been compelled by ill-health to retire from the duties of that position, Mr. John C. Sims, Jr., was appointed Secretary in his place. Mr. W. H. Frailey was also appointed Assistant Treasurer.

Mr. L. P. Farmer, having resigned his position as General Passenger Agent, Mr. James R. Wood was appointed to fill the vacancy, and Mr. George W. Boyd appointed Assistant General Passenger Agent.

Mr. J. L. Gossler, Assistant General Freight Agent for New York and New England, for many years in the service of lines identified with your system, having tendered his resignation, Mr. M. H. Smith was appointed General Agent for New York and New England; and upon his resignation, Mr. John Whittaker was promoted to that position.

Mr. George M. Ball was appointed Manager of the Empire Line, in the place of Mr. G. W. Ristine, resigned, and Mr. L. G. Kies, Western Superintendent, in place of Mr. George W. Cross, resigned.

Under the revised organization adopted Oct. 12, 1881, Mr. W. H. Brown was made Chief Engineer, with Mr. John C. Wilson and Mr. R. E. Pettit as Assistants; Mr. M. Riebenack, Assistant Comptroller; Mr. Thomas P. Sargent, Assistant Purchasing Agent, and Mr. George W. I. Ball, Chief Conveyancer.

Mr. S. M. Prevost was appointed Superintendent of the Philadelphia Division in place of Mr. Lockard, assigned to other duty on account of impaired health; Mr. H. H. Carter taking Mr. Prevost's place as Superintendent of the Middle Division, Mr. J. B. Hutchinson Mr. Carter's place as Superintendent of the Frederick Division, and Mr. William M. Phillips Mr. Hutchinson's place on the Lewistown Division.

Mr. E. B. Taylor having been transferred to your lines west of Pittsburgh, Mr. A. P. Kirkland was appointed Superintendent of the West Pennsylvania Division, and Mr. A. B. Starr Superintendent of the Sunbury, Hazleton & Wilkesbarre Railway, in place of Mr. L. L. Lodge, transferred. Mr. D. M. Watt was appointed Superintendent of the Monongahela Division, in place of Mr. J. M. Byres, assigned to important engineering work. Mr. William A. Baldwin, General Superintendent of the Philadelphia & Erie Railroad, having accepted the important position on your line west of Pittsburgh, was succeeded by Mr. Robert Neilson, Sept. 1, 1881.

CONCLUSION.

From the general account and other statements it will be seen that the Pennsylvania Railroad Company has no floating indebtedness, and that the corporations for which it is responsible have no floating indebtedness, except such as is held in your own treasury. It will be noted that the securities owned by the company, representing a cost on your books of the large amount of $79,719,156.25, produced a net income of over 4 per cent., or $3,211,465.63.

The board desires to acknowledge the fidelity and efficiency with which the officers and employés of the company have discharged the duties entrusted to them, which, owing to the great increase in traffic, have been more than usually onerous during the past year.

GENERAL ACCOUNT OF THE PENNSYLVANIA RAILROAD COMPANY.

Dr.			During year 1881. Increase.	Decrease.
To capital stock		$77,672,750.00	$8,802,550.00	
To first-mortgage bonds due 1880 (outstanding)	$21,000.00			$2,082,000.00
To general mortgage bonds due 1910	19,999,760.00			
To consolidated mortgage bonds due 1905	28,324,060.00			296,480.00
To consolidated mortgage bonds due 1919	5,000,000.00			
To Navy Yard mortgage registered bonds due 1901	1,000,000.00			
To lien of the state upon the public works between Philadelphia and Pittsburgh, bearing 5 per cent. interest, payable in annual installments of $460,000, applicable first to the interest, and the remainder to principal; the original amount of which was $7,500,000	3,561,365.78			271,701.00
To mortgages and ground rents payable	1,834,112.47		334,175.01	
		59,740,298.25		
To Pensylvania Company for Insurance on Lives and Granting Annuities, trust certificates		10,000,000.00	10,000,000.00	
Accounts payable, viz				
To passenger and freight balances due other roads	$524,369.54		183,279.18	
To pay-rolls and vouchers for December, 1881, due January, 1882	4,343,978.63		877,030.95	
To cash dividends due to stockholders unpaid	85,672.00			67,527.50
To dividend scrip of December, 1873, outstanding	963.61			335.00
To dividend scrip of May and November, 1880, outstanding	744.50		744.50	
To sundry accounts due other roads, etc	3,307,641.13		717,485.25	
		8,263,369.41		
To appraised value of securities owned by the United New Jersey Railroad & Canal Co., and transferred with the lease of the works of that company		3,895,584.60		
To equipment of road and canal owned by the United New Jersey Railroad & Canal Co., and transferred with the lease of the works of that company		2,805,854.53		357,850.00
To fund for the purchase of securities guaranteed by the Pennsylvania Railroad Co., under trust created Oct. 9, 1878	$1,900,000.00		600,000.00	
To 950 consolidated mortgage bonds redeemed and canceled	$25,940.00		291,480.00	
To balance to credit of profit and loss	10,344,079.34		2,550,130.63	
		13,170,019.34		
Total		$175,547,876.13	$24,356,875.52	$3,065,893.50
Less amount of decrease			3,065,893.50	
Total amount of increase			$21,290,982.02	

Cr.				
By balance standing on the books of the company for the construction of the railroad between Philadelphia and Pittsburgh, including the original cost of the Philadelphia & Columbia Railroad ($5,375,733.43); also the branches to Indiana, Hollidaysburg & Morrison's Cove; also the branch to connect with the Pittsburgh, Virginia and Charleston Railroad and branch at Tyrone; also bridge over the Susquehanna River at Columbia, and branches from Columbia to York, and Frazer to Woodland, comprising 1,119.27 miles of single track (exclusive of the Harrisburg & Lancaster Railroad, 98 70 miles), and including wharves and grain elevator, and cost of stations, warehouses and shops	$36,066,670.70		$1,699,949.96	
By balance to debt of equipment of road, consisting of 907 locomotives, 675 passenger cars, 175 baggage, mail and express cars, 22,265 freight cars and 2,161 road cars, including shop, machinery, steamboats and car floats, and also including equipment of canal, consisting of schooners, barges and tugs	19,875,039.80		1,836,838.84	
By cost of real estate of the company and telegraph lines	11,751,164.52		893,013.18	
Total amount charged to construction, equipment and real estate account, including sidings, stations, warehouses, shops and shop machinery, telegraph lines, canal equipment, etc., etc		$67,692,875.02		
Other assets.				
By cost of bonds of railroad corporations	$19,690,474.48			$4,044,350.67
By cost of capital stocks of railroad corporations	52,953,573.00		22,210,612.27	
By cost of bonds and stocks of municipal corporations, coal companies, canal companies, bridge companies, and investments not otherwise enumerated	7,075,108.77			280,787.21
Total cost of bonds and stocks belonging to the company		79,719,156.25		
By managers of trust created by Pennsylvania Railroad Co., Oct., 1878		1,900,000.00	600,000.00	
By insurance fund		16,000.00		
By mortage and ground rents receivable		88,661.00	18,926.40	
By amount expended for the purchase of anthracite coal lands, Hazleton, Hamilton, Eastwick and other tracts		738,010.98		26,245.05
By appraised value of securities owned by the United New Jersey Railroad & Canal Co., and transferred with the lease of the works of that company		3,895,584.60		
By equipment of road and canal owned by the United New Jersey Railroad & Canal Co., and transferred with the lease of the works of that company		2,805,854.53		357,850.00
By amount of fuel and materials on hand for repairs to locomotives, cars and maintenance of way, viz.:				
For the Pennsylvania Railroad	2,243,303.68		422,565.55	
For the United New Jersey Railroad & Canal	765,948.52		87,838.96	
For the Philadelphia & Erie Railroad	304,080.04			12,488.30
		3,313,321.24		
By amount of bills and accounts receivable, and amounts due from other roads, including edvances made to railroad corporations for construction, and purchase of equipment used on their lines, viz.:				
Philadelphia & Erie Railroad	$21,500.73			
United New Jersey Railroad & Canal construction	441,877.18		75,383.33	
United New Jersey Railroad & Canal sinking fund and redemption account	1,252,200.00		112,920.00	
United New Jersey Railroad & Canal real estate	655,421.22		154,444.79	
Other companies	8,192,459.45			710,949.20
		10,563,458.58		
By cash balance in hands of the Joint Stock Bank, London, and other parties to pay coupons due in January, 1882		1,141,997.34		13,038.56
By cash balance in hands of freight and passenger agents, etc	2,005,842.17		174,128.34	
By cash balance in hands of Treasurer	1,673,103.02			1,549,930.61
		3,678,945.00		
Total		$175,547,876.13	$28,286,621.62	$6,995,639.60
Less amount of decrease			6,995,639.60	
Total amount of increase			$21,290,982.02	

Virginia & Truckee.

This company owns a very circuitous road from Reno, Nev., to Virginia City, 52.2 miles, with a branch to Silver City, 1.5 miles, making 53.7 miles in all. It does a large business, both in through freight to Virginia, and also in hauling ore from the mines on the Comstock lead to the mills on the Carson River. The report is for the year ending Dec. 31, 1881.

The equipment consists of 17 engines; 10 passenger and 4 baggage, mail and express cars; 7 box, 237 flat and 117 ore cars.

The general account is as follows:

Stock		$6,000,000.00
Bonds		801,000.00
Due mining companies for advances		87,851.16
Total		$6,888,851.16
Road and equipment	$4,386,692.48	
Real estate	203,897.99	
Wood and materials	206,877.31	
Due from sundry sources	168,872.08	
		4,966,339.86
Excess of liabilities		$1,922,511.30

The bonded debt was reduced by $99.000 during the year.

In consequence of the destruction of the Secretary's books by fire several years ago, it is impossible for the officers of the company to state the amount of paid-up capital, and it is therefore necessarily omitted in the report.

The earnings for the year were as follows:

	1881.	1880.	Decrease.	P. c.
Earnings	$914,271.77	$1,124,300.32	$210,028.55	18.7
Expenses	519,707.66	674,553.38	154,845.72	22.9
Net earn	$394,564.11	$449,746.94	$55,182.83	12.3
Gross earn. per mile	17,025.54	20,936.69	3,911.15	18.7
Net earn. per mile	7,347.56	8,375.18	1,027.62	12.3
Per cent. of exps	56.84	60.00	3.16	....

The income account was as follows:

Net earnings		$394,464.11
Sale of old material, etc		45,756.38
Total		$440,220.49
Interest	$83,750	
Redemption of bonds	99,000	
Dividends	240,000	
		422,750.00
Balance		$17,470.49

Twelve monthly dividends were paid.

The business of the road has shown a decrease for several years, though it is still large.

The road carried 298,572 tons of freight last year, a decrease of 45,353 tons, or 12.1 per cent., from 1880, and of 97,282 tons, or 24.6 per cent., from 1879. Its traffic varies very much with the condition of affairs on the Comstock lode.